SONY

White paper

June 2013

Xperia™ Z Ultra

C6802

Note: Screen images are simulated.

Purpose of this document

Sony™ product White papers are intended to give an overview of a product and provide details in relevant areas of technology.

Document history

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Sony Mobile Developer World

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Product overview

Xperia™ Z Ultra – Big screen. Big entertainment.

- 6.44” HD Triluminos™ Display for mobile powered by X-Reality™ for mobile engine
- Ultra slim, waterproof and dust-resistant
- Qualcomm Snapdragon™ 800 quad-core 2.2 GHz processor
- Multi-task, write and sketch with any pencil
- Full accessory ecosystem for premium entertainment

Ultra large display

Built with the latest Sony BRAVIA technology, the Xperia™ Z Ultra is the first smartphone to incorporate Triluminos™ Display for mobile, for a wider palette of rich natural colours. This breakthrough technology includes X-Reality™* for mobile, Sony’s intelligent display technology which analyses each image to optimise colours, sharpness and contrast for vivid image quality whilst the super resolution feature reproduces lacking pixels for the sharpest videos.

** X-Reality™ for mobile will be available for this device through the forthcoming software upgrade available to download over the air. Sony Mobile will use reasonable endeavours to make this software available to end users in the week commencing September 9th, 2013 or as soon as possible thereafter. Software updates made available at different times depending on operator and country. Please check the version of software on your device as you may already have the latest software, depending on the date of purchase.*

Ultra entertainment

Watch movies, play games, read books and browse the web – with the Xperia™ Z Ultra’s extra-large HD screen. The superb sound quality of Sony’s ClearAudio+ and xLoud™ enhancement offers an exceptional hearing experience.

With the reader app, you can download your favourite e-books and enjoy them on your big screen. Through Sony’s media apps, you can discover the best way to enjoy and share photos, music and videos. And with a combination of Sony’s best technologies, you’ll get seamless access to online and offline content, for easy social sharing and endless discovery.

Ultra business

Besides entertaining, the Xperia™ Z Ultra is an ideal business partner. The super responsive screen comes with handwriting recognition and is compatible with a stylus or even an ordinary pencil. You’ll always be ready to record your best ideas the moment they hit you. And the carbon-copy function allows you to memorise notes and sketches. The design of the Xperia™ Z Ultra paired with the easy-toggle keyboard makes one-handed input easy. And true multi-tasking and small apps mean that you don’t have to lose any valuable time browsing between windows, which helps you improve productivity.

Facts – dimensions, weight, performance and networks

Operating system	Google™ Android™ 4.2 (Jelly Bean)
Processor	2.2 GHz Qualcomm MSM8274 or MSM8974 Quad Core
GPU	Adreno 330
Size	179.4x92.2x6.5 mm
Weight	212 grams
Available colours	Black White Purple
SIM card	Micro SIM
Main screen	
Colours	16,777,216 colour TFT
Resolution	1920x1080 pixels
Size (diagonal)	6.44 inches
Scratch-resistant	Shatterproof sheet on scratch-resistant glass
Input mechanisms	
Text input	On-screen QWERTY keyboard
Touch screen	Capacitive
Touch gesture	Yes – multi-touch, up to 10 fingers supported
Memory	
RAM	2 GB
Flash memory	Up to 16 GB*
Expansion slot	microSD™ card, up to 64 GB (SDXC supported)
Camera	
Camera resolution	8 MP
Digital zoom	16x
Video recording	Yes – HD 1080p
Front Camera	Yes – HD 1080p for video chat and 2 MP for camera capture
Sensors	
Accelerometer	Yes
Proximity sensor	Yes
Ambient light sensor	Yes

Magnetometer	Yes
Gyroscope	Yes
Networks	
C6802	UMTS HSPA+ 850 (Band V), 900 (Band VIII), 1700 (Band IV), 1900 (Band II), 2100 (Band I) MHz GSM GPRS/EDGE 850, 900, 1800, 1900 MHz
Data transfer speeds	
GSM GPRS	Up to 107 kbps
GSM EDGE	Up to 296 kbps
HSUPA (upload)	Cat 6, up to 5.8 Mbps
HSDPA (download)	Cat 24, up to 42 Mbps
Talk time (GSM)	Up to 11 hours**
Standby time (GSM)	Up to 550 hours**
Talk time (UMTS)	Up to 14 hours**
Standby time (UMTS)	Up to 530 hours**
Music listening time	Up to 120 hours**
Video playback time	Up to 5.5 hours**
Battery (Embedded)	3050 mAh typical 3000 mAh minimum

** Memory comprises approximately 5 GB of firmware plus 11 GB of "Internal storage" for music, pictures and movies, and downloaded applications and their data. For more details about memory, See "Memory in Android™ devices" on page 15.*

*** Values are according to GSM Association Battery Life Measurement Technique as performed in controlled laboratory conditions. Actual time may vary.*

NOTE: Battery performance may vary depending on network conditions and configurations, and phone usage.

NOTE: All performance metrics are measured under laboratory conditions.

Categorised feature list

Camera

8 megapixel camera
16x digital zoom
Auto focus
Burst mode
HDR for pictures and movies
Face detection
Front-facing camera (2 MP 1080p)
Geotagging
HD video recording (1080p)
Image stabiliser
Object tracking
Picture Effect
Quick Launch
Scene recognition
Self-timer
Send to web
Smile Shutter™
Sony Exmor RS® for mobile
Image sensor
Superior Auto
Sweep Panorama
Touch capture
Touch focus
White balance

Music

3D Surround Sound (VPT)
Album art
Bluetooth® stereo (aptX®, A2DP)
ClearAudio+
Clear Bass
Clear Phase™
Clear stereo
Dynamic normalizer
Music tones (MP3/AAC)
PlayNow™ service*
SensMe™
TrackID™ music recognition*
“WALKMAN” application
xLoud™ Experience

Internet

Bookmarks
Google Chrome™
Google Play™
Google™ search*
Google Voice™ Search*
Google Maps™ for Mobile with Street view and Latitude™*
NeoReader™ barcode scanner*
Pan & zoom

Communication

Call list
Facebook™ application*
Google Talk™ application*
Noise suppression
Polyphonic ringtones
Speakerphone
Twitter™ application*

Messaging

Conversations
Email
Google Mail™*
Handwriting recognition
Instant messaging
Multimedia messaging (MMS)
Predictive text input
Sound recorder
Text messaging (SMS)
Voice input

Design

Auto rotation
Face Unlock
Gesture input
IPX5 and IPX8 (Waterproof) & IP5X (Dust-resistant)
On-screen QWERTY keyboard
Pen input with stylus
Sensor-on-lens
STAMINA mode
Screenshot capturing
Throw
Triluminos™ Display for mobile
Touchscreen
X-Reality™ for mobile
Wallpaper

Entertainment

3D games
Media browser
Motion gaming
PlayMemories
PlayStation® Certified**
Radio (FM radio with RDS)
Reader mode
SensMe™ slideshow
Sony Entertainment Network*
TV launcher
Video streaming
YouTube™*

Organiser

Airplane mode
Alarm clock
Calculator
Calendar
Contacts
Document readers
eCompass™
Notes
Setup guide
Stopwatch
Tasks
Timer

Connectivity

3.5 mm audio jack (CTIA)
ANT+ sport fitness**
aGPS*
Bluetooth® 4.0 wireless technology
DLNA Certified®
GLONASS
MHL support
Media Go™
Media Transfer Protocol support
Micro USB support
Native USB tethering
NFC
PC Companion
Screen mirroring
Synchronisation via Exchange ActiveSync®
Synchronisation via Facebook™
Synchronisation via Google™
Synchronisation via SyncML™
USB charging
USB High speed 2.0 support
Xperia Link™
Wi-Fi®
Wi-Fi® Hotspot functionality

** This service is not available in all markets.*

*** This service is not available at the time of launch.*

Technologies in detail

NOTE: The information outlined below is general and levels of compliance to standards and specifications may vary between products and markets. For more information, contact Sony Mobile Developer World or your Sony contact person where applicable.

Device-to-device communications (local)

Bluetooth® wireless technology

Bluetooth® profiles supported	Advanced Audio Distribution Profile v1.2 (A2DP) Audio/Video Remote Control Profile v1.3 Device Identification Profile v1.3 Generic Attribute Profile Client/Server over LE Handsfree Profile v1.6 (Wide band speech) Headset Profile v1.2 Health Device Profile v1.1 Human Interface Device Profile, Host role v1.1 Messaging Access Profile v1.0 Object Push Profile v1.1 Personal Area Networking Profile v1.0 Phonebook Access Profile v1.1 Proximity Monitor Profile over LE v1.0 Serial Port Profile v1.1
Core version and supported core features	Version 4.0
Other supported features	aptX® CD quality audio streaming over Bluetooth®
Connectable devices	Products support at least one of the Bluetooth® profiles above. Bluetooth® 4.0 accessories generally require installation of a supporting application.

More information:

www.sonymobile.com/developer

www.bluetooth.com

Wi-Fi®

Supported standards	IEEE 802.11a/b/g/n/ac and Wi-Fi® Wi-Fi Direct, Wi-Fi Protected Setup
Connectable devices	Wi-Fi® access points Wi-Fi Direct compatible devices
Frequency band	2.4 GHz/5 GHz
Data transfer rate	Up to 325 Mbit/s
Security	Open Authentication Shared Authentication EAP-SIM EAP-AKA EAP-TLS EAP-TTLS/MSCHAPv2 PEAPv0/EAP-MSCHAPv2 PEAPv1/EAP-GTC WPA Personal and WPA2 Personal WPA Enterprise and WPA2 Enterprise
Encryption	WEP 64 bit, WEP 128 bit, TKIP and CCMP (AES)
Power save	WMM-UAPSD
QoS	WMM

DLNA Certified® (Digital Living Network Alliance)

Supported Device Classes	**M-DMS – Mobile Digital Media Server** Media Types: images, music and video Summary: The digital media server exposes the media files in your phone to a Wi-Fi® network. The files can then be accessed from other DLNA Certified® clients. **+PU+** Media Types: image, video and music Summary: Play media in the phone on another device, such as a TV or computer using 2 box push technology. +PU+ is integrated in the Album, Movies and “Walkman” applications. **M-DMP – Mobile Digital Media Player** Media Types: image, video and music Summary: Play content stored on another device, for example, a server or a PC, directly on the phone. **+DN+** Media Types: video and music Summary: Download content stored on another device, for example, a server or a PC, and play the downloaded content directly on the phone.
Supported Bearers	Wi-Fi® Wi-Fi® Direct
DRM Support	The DLNA Certified® implementation does not support DRM-protected content. DTCP-IP is supported for Japanese product.

Messaging

MMS (Multimedia Messaging Service)

According to OMA Multimedia Messaging Service v1.0 + SMIL

Email

Bearer type (IP)	GPRS, EGPRS, UMTS
Character sets	BIG5 Traditional Chinese GB18030 ISO-2022-JP Japanese ISO-8859-1 ISO-8859-2 Eastern Europe ISO-8859-5 Cyrillic ISO-8859-7 Greek ISO-8859-9 Turkish ISO 8859-11 KOI8-R Cyrillic Shift_JIS Japanese US-ASCII UTF-16 UTF-8 Windows® 874 Windows® 1251 Cyrillic Windows® 1252 Windows® 1254 Turkish Windows® 1258 Vietnamese
Protocols	POP3 and IMAP4
Push email	Microsoft® Exchange ActiveSync® (EAS)
Secure email	SSL/TLS, both port methods (POPS/IMAPS) and STARTTLS
HTML mail	Yes (read only)

More information:

www.sonymobile.com/developer

www.openmobilealliance.org

Positioning – location based services

Supported standards:

- OMA Secure User Plane Location (SUPL) v1.0 & v2.0
- 3GPP™ Control Plane location (incl. Emergency location)
- Qualcomm® GPSOneXtra™

Supported satellite systems:

- GPS
- GLONASS

NOTE*:* GPS and GLONASS are used together to calculate the position. Positioning is more robust and accurate in most conditions if both systems are active. The benefits of using GLONASS are automatically available for all applications using the Satellite Positioning API (referred to "GPS Provider" in Android terminology).

Provisioning (OMA CP)

OMA CP version 1.1

Multimedia (audio, image and video)

Audio Playback	**Decoder format**	**Supported in file format**
	MP3	MP3 (.mp3)
	AAC (AAC-LC, AAC+, eAAC+)	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a), ADTS (.aac)
	AMR-NB, AMR-WB	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4a), AMR (.amr, .awb)
	MIDI	SMF (.mid), XMF (.xmf), Mobile XMF (.mxmf), OTA (.ota), RTTTL (.rtttl), RTX (.rtx), iMelody (imy)
	PCM	WAV (.wav)
	OTA	OTA (.ota)
	Vorbis	OGG (.ogg)
	FLAC	FLAC (.flac)
Audio Recording	**Encoder format**	**Supported in file format**
	AMR (AMR-NB, AMR-WB)	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a), AMR (.amr)
	AAC	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
Image Playback	**Decoder format**	**Supported in file format**
	Windows bitmap	BMP (.bmp)
	GIF	GIF (.gif)
	JPEG	JPEG (.jpg, .jpeg)
	PNG	PNG (.png)
	Wireless Bitmap	WBMP (.wbmp)
	WebP	WebP (.webp)
Image Capture	**Encoder format**	**Supported in file format**
	JPEG	JPEG (.jpg)

Video Playback	**Decoder format**	**Supported in file format**
	MPEG-4	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv), AVI (.avi), Xvid (.xvid)
	MPEG-2 (only for Japanese market)	MPEG2-TS (.ts)
	H.264	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv), MPEG2-TS (.ts)
	H.263	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v)
	VP8	Webm (.webm, .mkv)
Video Recording	**Encoder format**	**Supported in file format**
	H.264	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
	H.263	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
	MPEG-4	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
Audio/Video Streaming	Streaming transport	RTSP HTTP progressive download HLS
DRM	DRM (Digital Rights Management) – features the rights and copy protection of downloaded content	OMA DRM v1.0 Marlin DRM Widevine Level 3 PlayReady DRM (available in specific regions)

Synchronisation (OMA DS, EAS, Google Sync™)

OMA Data Synchronisation protocol versions 1.1.2 and 1.2

OMA Data Formats: vCard 2.1, vCalendar 1.0

Microsoft® Exchange ActiveSync® protocol version 2.5

Microsoft® Exchange ActiveSync® protocol version 12

Microsoft® Exchange ActiveSync® protocol version 12.1

Microsoft® Exchange ActiveSync® protocol version 14

Microsoft® Exchange ActiveSync® protocol version 14.1

Google Sync™

Related information:

www.sonymobile.com/developer

Web browser

Google Chrome™ for Android™ is pre-installed.*

Related information:

https://play.google.com/store/apps/details?id=com.android.chrome

* Google *Chrome™ is not available for all markets.*

Memory in Android™ devices

To use Android devices efficiently, users should be aware of the different types of device memory. This knowledge is important in order to understand, for example, where music, photos and videos are saved; how many apps can be downloaded from Google Play™; and how photos can be copied to a PC.

The below information is also of interest to developers who want to optimise their programs to make the best possible use of the resources in the device.

Generally, all Android devices share the same basic memory setup. What differs is how much memory is available to you via the different types of memory, and whether your device uses an external SD card or an internal memory chip. Any information specific to the particular device model described in this White Paper is noted as such.

Types of memory

The types of memory described and numbered below are consistent with the terminology used in Sony mobile device menus and in other content relating to 2013 Xperia™ devices:

1. **Dynamic Memory** (also known as RAM) is used by applications that run when the device is turned on. The amount of Dynamic Memory influences how many applications and operating system services can run at the same time. The Android operating system automatically closes applications and services that are not being used.

   However, such automatic functionality has limits. For example, if a lower amount of free RAM is available to applications after a new release of the operating system (due to increased capabilities in the system), device speed will eventually be impacted. This is the main reason that a device cannot be indefinitely upgraded to newer releases of Android™.

   If you experience problems with RAM, for example, if the device runs slower than usual or if the Home application restarts frequently when you leave an application, you should minimise the use of apps that run all the time. Such apps could include, for example, applications that frequently download social networking service updates. You could also consider using a static wallpaper instead of a live wallpaper.

   To see which apps and services are currently active, go to **Settings > Applications > Running Services**. You should have at least 50 MB, and ideally 100 MB or more, of free RAM to avoid slowdowns and application restarts.

   You should also be aware that if you update the device to a later Android release, the load on the built-in Dynamic Memory will increase due to the addition of more features, as mentioned above. As a result, the device may run slower after an update.

   The Xperia™ Z Ultra has about 2 GB of RAM available to the Android OS and applications, of which about 200 MB is already used out of the box.

2. **System Memory** (also known as “System partition” or “/system”) is used for the Android OS and for most applications that are pre-loaded from the factory. This type of memory is normally locked, and can only be changed through a firmware upgrade. There is usually some free space available in this section of memory. However, since it is locked, you cannot save apps, photos or any other content to this memory. System Memory is reserved for future firmware upgrades, which almost always need more memory than the original firmware. You cannot see or influence the use of this memory.

3. **Internal Storage** is memory used as” working” memory. It can be compared to the C: drive on a PC or to the startup disk on a Mac.

This type of memory is used to store all application downloaded from the Google Play™ Store (and other sources) as well as their settings and data (such as emails, messages and calendar events, for example). All applications have an allocated area which no other applications can access and where the application data can be stored.

Some game applications also store content such as game music and game level information outside their own designated area. In most cases, an application can choose to save its data in a location of its own choosing (outside the protected application settings area). Generally, such content is not deleted when an application is uninstalled; it must be removed manually by connecting the device to a computer with a USB cable, or by using a file manager application.

Internal Storage is also used for all user content added, for example, as a result of the user taking photos with the camera, downloading media files, and performing file transfers. Typical user content includes:

- photos
- movies
- music
- downloaded documents (as email attachments, for example)

Internal Storage will tend to fill up as a result of normal usage. Examples of such usage are the saving of data by applications; the downloading and installation of new applications; the downloading of free or paid content; and the shooting of pictures and movies. Therefore, the larger this memory is from the start, the more applications you can download and use, and the more pictures and movies you can shoot.

If the Internal Storage starts to get full, the device slows down, and in some cases it might no longer be possible to install more apps. You should always ensure that you have at least 100 MB of free Internal Storage. If not, you should consider removing some apps that you seldom use, or move content that you do not frequently access to safe storage.

You can see approximately how much Internal Storage is free in **Settings** > **Storage** >**Internal Storage**. You can also view more detail about how much memory is used by applications in **Settings** > **Applications** > **Manage Applications**. In the Xperia™ Z Ultra, about 11 GB of Internal Storage is available out of the box.

Please note that in Sony Mobile 2013 products, “Internal Storage” is now the combination of what was previously known as “Device Memory” or “Phone Memory” (for applications and their data – also previously known as “/data”) and “Internal Storage” (for user’s content – also previously known as “/sdcard”). The reason for this change is to make the use of available memory more flexible, and also to enable the optional encryption of user’s content.

Memory card slot

In some products you may find both a large internal memory and a memory card reader slot. However, on the current Android platform, the card reader slot does not work in the same manner in a device with a large internal memory as it does in a device with ONLY a memory card slot.

Generally, since most applications expect only a single location for storage, such applications will not generally allow you to SAVE anything to the memory card (i.e., they do not offer the option to choose a storage location). However, some applications (for instance, the Sony Mobile “Camera” application) may actually allow you to do so. Other applications, for example, backup applications such as the Sony Mobile “Memory” application, will by definition be configured to copy content from the Internal Storage to the external SD card.

On the other hand, when it comes to reading from an external SD Card, you will be able to access content (for example, videos, photos and music) on a memory card inserted in this slot without any special consideration since the Android system searches all available memory for content. Therefore, such products may be regarded as supporting a fourth type of memory, called “External Card” or “SD Card”.

4. **SD Card** (known as “/ext_card” from a programmer’s point of view, or by other names in other Android products) is the name for the removable SD memory card in all 2013 Sony Mobile products. As described above, this External Card memory is generally more limited in that any application can read from it, but many applications cannot save to this card. Only a few applications, including backup applications and file manger applications, have the capability to save to this card.

Backing up data to different memory types
Generally, you should not save photos, videos and other personal content solely on the internal memory of a device. If something should happen with the hardware, or if the device is lost or stolen, the data stored on the device’s internal memory is gone forever.

In a device where an SD card reader is the main memory, it is relatively easy to take the card out and copy all content to a PC or Mac, or to an entertainment device with a memory card slot. In a product featuring Internal Storage as the main memory, it is not possible to physically remove the memory. Instead, any critical or high-value content must either be copied to an external SD card by a special backup application, transferred to remote storage over a network (mobile or Wi-Fi), or to a computer via a USB cable.

To facilitate the transfer of data via a cable, the Xperia™ Z Ultra supports the Microsoft standard, Media Transfer Protocol (MTP), which makes it possible to easily transfer content back and forth between your device and a Windows PC. For Apple Mac computers, a special application called Sony Bridge for Mac is available with built-in support for MTP. This application can be downloaded from the Xperia™ Z Ultra Support page.

Note that you do not need to back up or make a copy of applications that you have downloaded from the Google Play™ Store. They can normally be downloaded again after you have set up your Google account to work in a new device (or in a device where the memory has been completely erased).

Note 1:
As noted above, some Android devices, including Sony Mobile devices from 2012 and Sony Ericsson devices from 2011 and earlier, do not use a single “Internal Storage” for both applications (and their data) and user content. Instead, these devices use either an external SD card for user content, or a corresponding area of internal memory to reproduce the functionality of an SD card. In such devices, there is a fixed limit between the application area (“/data”) and the user content area (“/sdcard”), with the result that user content can build up and reach this limit. The consequence of such a limit being reached, for example, for the camera application, would be that no new pictures could be taken even if there was still a considerable amount of free space in the application area (or in the user content area). In such an instance, the download and installation of new applications would also not be possible, even if there was enough free memory in the content area.

Note 2:
Some devices with integrated storage have abandoned the distinction between the application area and the content area when it comes to a Factory Data Reset. As a result, there is no option in such devices to perform a Factory Data Reset and preserve content. In such devices, all content is mandatorily and completely deleted from the device when a reset is performed.

In contrast, Sony Mobile’s memory integration solution makes it possible to preserve user content in this situation. Therefore, when performing a Factory Data Reset, the default action will still be to only remove applications and their data, and an option box must be checked if all content is to be removed as well (as might be desirable when selling the device second-hand, for instance).

Note 3:
For a developer, it is important to note that from a programming point of view the location names used to refer to the different memory areas described in Note 1 are still valid, i.e., the area used for applications ("/data") is still present, as is the area used for content ("/sdcard").

In reality, "sdcard" is a so-called "symbolic link" to "/data/media". However, from inside an Android application, "/sdcard" can still be used. For example, you can use "sdcard/DCIM/100Android" to find all camera images. The continued use of "/sdcard" to access the content area ensures compatibility across different products and Android releases in this regard.

Trademarks and acknowledgements

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Visit *www.sonymobile.com* for more information.

SONY

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June 2013

Xperia™ Z Ultra

XL39h

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** X-Reality™ for mobile will be available for this device through the forthcoming software upgrade available to download over the air. Sony Mobile will use reasonable endeavours to make this software available to end users in the week commencing September 9th, 2013 or as soon as possible thereafter. Software updates made available at different times depending on operator and country. Please check the version of software on your device as you may already have the latest software, depending on the date of purchase.*

Ultra entertainment

Watch movies, play games, read books and browse the web – with the Xperia™ Z Ultra’s extra-large HD screen. The superb sound quality of Sony’s ClearAudio+ and xLoud™ enhancement offers an exceptional hearing experience.

With the reader app, you can download your favourite e-books and enjoy them on your big screen. Through Sony’s media apps, you can discover the best way to enjoy and share photos, music and videos. And with a combination of Sony’s best technologies, you’ll get seamless access to online and offline content, for easy social sharing and endless discovery.

Ultra business

Besides entertaining, the Xperia™ Z Ultra is an ideal business partner. The super responsive screen comes with handwriting recognition and is compatible with a stylus or even an ordinary pencil. You’ll always be ready to record your best ideas the moment they hit you. And the carbon-copy function allows you to memorise notes and sketches. The design of the Xperia™ Z Ultra paired with the easy-toggle keyboard makes one-handed input easy. And true multi-tasking and small apps mean that you don’t have to lose any valuable time browsing between windows, which helps you improve productivity.

Facts – dimensions, weight, performance and networks

Operating system	Google™ Android™ 4.2 (Jelly Bean)
Processor	2.2 GHz Qualcomm MSM8274 Quad Core
GPU	Adreno 330
Size	179.4x92.2x6.5 mm
Weight	212 grams
Available colours	Black White Purple
SIM card	Micro SIM
Main screen	
Colours	16,777,216 colour TFT
Resolution	1920x1080 pixels
Size (diagonal)	6.44 inches
Scratch-resistant	Shatterproof sheet on scratch-resistant glass
Input mechanisms	
Text input	On-screen QWERTY keyboard
Touch screen	Capacitive
Touch gesture	Yes – multi-touch, up to 10 fingers supported
Memory	
RAM	2 GB
Flash memory	Up to 16 GB*
Expansion slot	microSD™ card, up to 64 GB (SDXC supported)
Camera	
Camera resolution	8 MP
Digital zoom	16x
Video recording	Yes – HD 1080p
Front Camera	Yes – HD 1080p for video chat and 2 MP for camera capture
Sensors	
Accelerometer	Yes
Proximity sensor	Yes
Ambient light sensor	Yes

Magnetometer	Yes
Gyroscope	Yes
Networks	
XL39h	UMTS HSPA+ 850 (Band V), 900 (Band VIII), 1700 (Band IV), 1900 (Band II), 2100 (Band I) MHz GSM GPRS/EDGE 850, 900, 1800, 1900 MHz
Data transfer speeds	
GSM GPRS	Up to 107 kbps
GSM EDGE	Up to 296 kbps
HSUPA (upload)	Cat 6, up to 5.8 Mbps
HSDPA (download)	Cat 24, up to 42 Mbps
Talk time (GSM)	Up to 14 hours***
Standby time (GSM)	Up to 790 hours***
Talk time (UMTS)	Up to 16 hours***
Standby time (UMTS)	Up to 820 hours***
Music listening time	Up to 120 hours***
Video playback time	Up to 7.5 hours***
Battery (Embedded)	3050 mAh typical 3000 mAh minimum

** Memory comprises approximately 5 GB of firmware plus 11 GB of "Internal storage" for music, pictures and movies, and downloaded applications and their data. For more details about memory, See "Memory in Android™ devices" on page 16.*

**** Values are according to GSM Association Battery Life Measurement Technique as performed in controlled laboratory conditions. Actual time may vary.*

NOTE: Battery performance may vary depending on network conditions and configurations, and phone usage.

NOTE: All performance metrics are measured under laboratory conditions.

Categorised feature list

Camera

8 megapixel camera
16x digital zoom
Auto focus
Burst mode
HDR for pictures and movies
Face detection
Front-facing camera (2 MP 1080p)
Geotagging
HD video recording (1080p)
Image stabiliser
Object tracking
Picture Effect
Quick Launch
Scene recognition
Self-timer
Send to web
Smile Shutter™
Sony Exmor RS® for mobile
Image sensor
Superior Auto
Sweep Panorama
Touch capture
Touch focus
White balance

Music

3D Surround Sound (VPT)
Album art
Bluetooth® stereo (aptX®, A2DP)
ClearAudio+
Clear Bass
Clear Phase™
Clear stereo
Dynamic normalizer
Music tones (MP3/AAC)
PlayNow™ service*
SensMe™
TrackID™ music recognition*
“WALKMAN” application
xLoud™ Experience

Internet

Bookmarks
Google Chrome™
Google Play™
Google™ search*
Google Voice™ Search*
Google Maps™ for Mobile with Street view and Latitude™*
NeoReader™ barcode scanner*
Pan & zoom

Communication

Call list
Facebook™ application*
Google Talk™ application*
Noise suppression
Polyphonic ringtones
Speakerphone
Twitter™ application*

Messaging

Conversations
Email
Google Mail™*
Handwriting recognition
Instant messaging
Multimedia messaging (MMS)
Predictive text input
Sound recorder
Text messaging (SMS)
Voice input

Design

Auto rotation
Face Unlock
Gesture input
IPX5 and IPX8 (Waterproof) & IP5X (Dust-resistant)
On-screen QWERTY keyboard
Pen input with stylus
Sensor-on-lens
STAMINA mode
Screenshot capturing
Throw
Triluminos™ Display for mobile
Touchscreen
X-Reality™ for mobile
Wallpaper

Entertainment

3D games
Media browser
Motion gaming
PlayMemories
Radio (FM radio with RDS)
Reader mode
SensMe™ slideshow
Sony Entertainment Network*
TV launcher
Video streaming
YouTube™*

Organiser

Airplane mode
Alarm clock
Calculator
Calendar
Contacts
Document readers
eCompass™
Notes
Setup guide
Stopwatch
Tasks
Timer

Connectivity

3.5 mm audio jack (CTIA)
ANT+ sport fitness**
aGPS*
Bluetooth® 4.0 wireless technology
DLNA Certified®
GLONASS
MHL support
Media Go™
Media Transfer Protocol support
Micro USB support
Native USB tethering
NFC
PC Companion
Screen mirroring
Synchronisation via Exchange ActiveSync®
Synchronisation via Facebook™
Synchronisation via Google™
Synchronisation via SyncML™
USB charging
USB High speed 2.0 support
Xperia Link™
Wi-Fi®
Wi-Fi® Hotspot functionality

** This service is not available in all markets.*

*** This service is not available in all markets and is not available at the time of launch.*

Technologies in detail

NOTE: The information outlined below is general and levels of compliance to standards and specifications may vary between products and markets. For more information, contact Sony Mobile Developer World or your Sony contact person where applicable.

Device-to-device communications (local)

Bluetooth® wireless technology

Bluetooth® profiles supported	Advanced Audio Distribution Profile v1.2 (A2DP) Audio/Video Remote Control Profile v1.3 Device Identification Profile v1.3 Generic Attribute Profile Client/Server over LE Handsfree Profile v1.6 (Wide band speech) Headset Profile v1.2 Health Device Profile v1.1 Human Interface Device Profile, Host role v1.1 Messaging Access Profile v1.0 Object Push Profile v1.1 Personal Area Networking Profile v1.0 Phonebook Access Profile v1.1 Proximity Monitor Profile over LE v1.0 Serial Port Profile v1.1
Core version and supported core features	Version 4.0
Other supported features	aptX® CD quality audio streaming over Bluetooth®
Connectable devices	Products support at least one of the Bluetooth® profiles above. Bluetooth® 4.0 accessories generally require installation of a supporting application.

More information:

www.sonymobile.com/developer

www.bluetooth.com

Wi-Fi®

Supported standards	IEEE 802.11a/b/g/n/ac and Wi-Fi® Wi-Fi Direct, Wi-Fi Protected Setup
Connectable devices	Wi-Fi® access points Wi-Fi Direct compatible devices
Frequency band	2.4 GHz/5 GHz
Data transfer rate	Up to 325 Mbit/s
Security	Open Authentication Shared Authentication EAP-SIM EAP-AKA EAP-TLS EAP-TTLS/MSCHAPv2 PEAPv0/EAP-MSCHAPv2 PEAPv1/EAP-GTC WPA Personal and WPA2 Personal WPA Enterprise and WPA2 Enterprise
Encryption	WEP 64 bit, WEP 128 bit, TKIP and CCMP (AES)
Power save	WMM-UAPSD
QoS	WMM

DLNA Certified® (Digital Living Network Alliance)

Supported Device Classes	**M-DMS – Mobile Digital Media Server** Media Types: images, music and video Summary: The digital media server exposes the media files in your phone to a Wi-Fi® network. The files can then be accessed from other DLNA Certified® clients. **+PU+** Media Types: image, video and music Summary: Play media in the phone on another device, such as a TV or computer using 2 box push technology. +PU+ is integrated in the Album, Movies and “Walkman” applications. **M-DMP – Mobile Digital Media Player** Media Types: image, video and music Summary: Play content stored on another device, for example, a server or a PC, directly on the phone. **+DN+** Media Types: video and music Summary: Download content stored on another device, for example, a server or a PC, and play the downloaded content directly on the phone.
Supported Bearers	Wi-Fi® Wi-Fi® Direct
DRM Support	The DLNA Certified® implementation does not support DRM-protected content. DTCP-IP is supported for Japanese product.

Messaging

MMS (Multimedia Messaging Service)

According to OMA Multimedia Messaging Service v1.0 + SMIL

Email

Bearer type (IP)	GPRS, EGPRS, UMTS
Character sets	BIG5 Traditional Chinese GB18030 ISO-2022-JP Japanese ISO-8859-1 ISO-8859-2 Eastern Europe ISO-8859-5 Cyrillic ISO-8859-7 Greek ISO-8859-9 Turkish ISO 8859-11 KOI8-R Cyrillic Shift_JIS Japanese US-ASCII UTF-16 UTF-8 Windows® 874 Windows® 1251 Cyrillic Windows® 1252 Windows® 1254 Turkish Windows® 1258 Vietnamese
Protocols	POP3 and IMAP4
Push email	Microsoft® Exchange ActiveSync® (EAS)
Secure email	SSL/TLS, both port methods (POPS/IMAPS) and STARTTLS
HTML mail	Yes (read only)

More information:

www.sonymobile.com/developer

www.openmobilealliance.org

Positioning – location based services

Supported standards:

- OMA Secure User Plane Location (SUPL) v1.0 & v2.0
- 3GPP™ Control Plane location (incl. Emergency location)
- Qualcomm® GPSOneXtra™

Supported satellite systems:

- GPS
- GLONASS

NOTE*:* GPS and GLONASS are used together to calculate the position. Positioning is more robust and accurate in most conditions if both systems are active. The benefits of using GLONASS are automatically available for all applications using the Satellite Positioning API (referred to "GPS Provider" in Android terminology).

Provisioning (OMA CP)

OMA CP version 1.1

Multimedia (audio, image and video)

Audio Playback	**Decoder format**	**Supported in file format**
	MP3	MP3 (.mp3)
	AAC (AAC-LC, AAC+, eAAC+)	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a), ADTS (.aac)
	AMR-NB, AMR-WB	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4a), AMR (.amr, .awb)
	MIDI	SMF (.mid), XMF (.xmf), Mobile XMF (.mxmf), OTA (.ota), RTTTL (.rtttl), RTX (.rtx), iMelody (imy)
	PCM	WAV (.wav)
	OTA	OTA (.ota)
	Vorbis	OGG (.ogg)
	FLAC	FLAC (.flac)
Audio Recording	**Encoder format**	**Supported in file format**
	AMR (AMR-NB, AMR-WB)	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a), AMR (.amr)
	AAC	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
Image Playback	**Decoder format**	**Supported in file format**
	Windows bitmap	BMP (.bmp)
	GIF	GIF (.gif)
	JPEG	JPEG (.jpg, .jpeg)
	PNG	PNG (.png)
	Wireless Bitmap	WBMP (.wbmp)
	WebP	WebP (.webp)
Image Capture	**Encoder format**	**Supported in file format**
	JPEG	JPEG (.jpg)

Video Playback	**Decoder format**	**Supported in file format**
	MPEG-4	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv), AVI (.avi), Xvid (.xvid)
	MPEG-2 (only for Japanese market)	MPEG2-TS (.ts)
	H.264	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv), MPEG2-TS (.ts)
	H.263	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v)
	VP8	Webm (.webm, .mkv)
Video Recording	**Encoder format**	**Supported in file format**
	H.264	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
	H.263	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
	MPEG-4	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
Audio/Video Streaming	Streaming transport	RTSP HTTP progressive download HLS
DRM	DRM (Digital Rights Management) – features the rights and copy protection of downloaded content	OMA DRM v1.0 Marlin DRM Widevine Level 3 PlayReady DRM (available in specific regions)

Synchronisation (OMA DS, EAS, Google Sync™)

OMA Data Synchronisation protocol versions 1.1.2 and 1.2

OMA Data Formats: vCard 2.1, vCalendar 1.0

Microsoft® Exchange ActiveSync® protocol version 2.5

Microsoft® Exchange ActiveSync® protocol version 12

Microsoft® Exchange ActiveSync® protocol version 12.1

Microsoft® Exchange ActiveSync® protocol version 14

Microsoft® Exchange ActiveSync® protocol version 14.1

Google Sync™

Related information:

www.sonymobile.com/developer

Web browser

Google Chrome™ for Android™ is pre-installed.*

Related information:

https://play.google.com/store/apps/details?id=com.android.chrome

* Google *Chrome™ is not available for all markets.*

Memory in Android™ devices

To use Android devices efficiently, users should be aware of the different types of device memory. This knowledge is important in order to understand, for example, where music, photos and videos are saved; how many apps can be downloaded from Google Play™; and how photos can be copied to a PC.

The below information is also of interest to developers who want to optimise their programs to make the best possible use of the resources in the device.

Generally, all Android devices share the same basic memory setup. What differs is how much memory is available to you via the different types of memory, and whether your device uses an external SD card or an internal memory chip. Any information specific to the particular device model described in this White Paper is noted as such.

Types of memory

The types of memory described and numbered below are consistent with the terminology used in Sony mobile device menus and in other content relating to 2013 Xperia™ devices:

1. **Dynamic Memory** (also known as RAM) is used by applications that run when the device is turned on. The amount of Dynamic Memory influences how many applications and operating system services can run at the same time. The Android operating system automatically closes applications and services that are not being used.

   However, such automatic functionality has limits. For example, if a lower amount of free RAM is available to applications after a new release of the operating system (due to increased capabilities in the system), device speed will eventually be impacted. This is the main reason that a device cannot be indefinitely upgraded to newer releases of Android™.

   If you experience problems with RAM, for example, if the device runs slower than usual or if the Home application restarts frequently when you leave an application, you should minimise the use of apps that run all the time. Such apps could include, for example, applications that frequently download social networking service updates. You could also consider using a static wallpaper instead of a live wallpaper.

   To see which apps and services are currently active, go to **Settings > Applications > Running Services**. You should have at least 50 MB, and ideally 100 MB or more, of free RAM to avoid slowdowns and application restarts.

   You should also be aware that if you update the device to a later Android release, the load on the built-in Dynamic Memory will increase due to the addition of more features, as mentioned above. As a result, the device may run slower after an update.

   The Xperia™ Z Ultra has about 2 GB of RAM available to the Android OS and applications, of which about 200 MB is already used out of the box.

2. **System Memory** (also known as “System partition” or “/system”) is used for the Android OS and for most applications that are pre-loaded from the factory. This type of memory is normally locked, and can only be changed through a firmware upgrade. There is usually some free space available in this section of memory. However, since it is locked, you cannot save apps, photos or any other content to this memory. System Memory is reserved for future firmware upgrades, which almost always need more memory than the original firmware. You cannot see or influence the use of this memory.

3. **Internal Storage** is memory used as” working” memory. It can be compared to the C: drive on a PC or to the startup disk on a Mac.

This type of memory is used to store all application downloaded from the Google Play™ Store (and other sources) as well as their settings and data (such as emails, messages and calendar events, for example). All applications have an allocated area which no other applications can access and where the application data can be stored.

Some game applications also store content such as game music and game level information outside their own designated area. In most cases, an application can choose to save its data in a location of its own choosing (outside the protected application settings area). Generally, such content is not deleted when an application is uninstalled; it must be removed manually by connecting the device to a computer with a USB cable, or by using a file manager application.

Internal Storage is also used for all user content added, for example, as a result of the user taking photos with the camera, downloading media files, and performing file transfers. Typical user content includes:

- photos
- movies
- music
- downloaded documents (as email attachments, for example)

Internal Storage will tend to fill up as a result of normal usage. Examples of such usage are the saving of data by applications; the downloading and installation of new applications; the downloading of free or paid content; and the shooting of pictures and movies. Therefore, the larger this memory is from the start, the more applications you can download and use, and the more pictures and movies you can shoot.

If the Internal Storage starts to get full, the device slows down, and in some cases it might no longer be possible to install more apps. You should always ensure that you have at least 100 MB of free Internal Storage. If not, you should consider removing some apps that you seldom use, or move content that you do not frequently access to safe storage.

You can see approximately how much Internal Storage is free in **Settings** > **Storage** >**Internal Storage**. You can also view more detail about how much memory is used by applications in **Settings** > **Applications** > **Manage Applications**. In the Xperia™ Z Ultra, about 11 GB of Internal Storage is available out of the box.

Please note that in Sony Mobile 2013 products, “Internal Storage” is now the combination of what was previously known as “Device Memory” or “Phone Memory” (for applications and their data – also previously known as “/data”) and “Internal Storage” (for user’s content – also previously known as “/sdcard”). The reason for this change is to make the use of available memory more flexible, and also to enable the optional encryption of user’s content.

Memory card slot

In some products you may find both a large internal memory and a memory card reader slot. However, on the current Android platform, the card reader slot does not work in the same manner in a device with a large internal memory as it does in a device with ONLY a memory card slot.

Generally, since most applications expect only a single location for storage, such applications will not generally allow you to SAVE anything to the memory card (i.e., they do not offer the option to choose a storage location). However, some applications (for instance, the Sony Mobile “Camera” application) may actually allow you to do so. Other applications, for example, backup applications such as the Sony Mobile “Memory” application, will by definition be configured to copy content from the Internal Storage to the external SD card.

On the other hand, when it comes to reading from an external SD Card, you will be able to access content (for example, videos, photos and music) on a memory card inserted in this slot without any special consideration since the Android system searches all available memory for content. Therefore, such products may be regarded as supporting a fourth type of memory, called “External Card” or “SD Card”.

4. **SD Card** (known as “/ext_card” from a programmer’s point of view, or by other names in other Android products) is the name for the removable SD memory card in all 2013 Sony Mobile products. As described above, this External Card memory is generally more limited in that any application can read from it, but many applications cannot save to this card. Only a few applications, including backup applications and file manger applications, have the capability to save to this card.

Backing up data to different memory types
Generally, you should not save photos, videos and other personal content solely on the internal memory of a device. If something should happen with the hardware, or if the device is lost or stolen, the data stored on the device’s internal memory is gone forever.

In a device where an SD card reader is the main memory, it is relatively easy to take the card out and copy all content to a PC or Mac, or to an entertainment device with a memory card slot. In a product featuring Internal Storage as the main memory, it is not possible to physically remove the memory. Instead, any critical or high-value content must either be copied to an external SD card by a special backup application, transferred to remote storage over a network (mobile or Wi-Fi), or to a computer via a USB cable.

To facilitate the transfer of data via a cable, the Xperia™ Z Ultra supports the Microsoft standard, Media Transfer Protocol (MTP), which makes it possible to easily transfer content back and forth between your device and a Windows PC. For Apple Mac computers, a special application called Sony Bridge for Mac is available with built-in support for MTP. This application can be downloaded from the Xperia™ Z Ultra Support page.

Note that you do not need to back up or make a copy of applications that you have downloaded from the Google Play™ Store. They can normally be downloaded again after you have set up your Google account to work in a new device (or in a device where the memory has been completely erased).

Note 1:
As noted above, some Android devices, including Sony Mobile devices from 2012 and Sony Ericsson devices from 2011 and earlier, do not use a single “Internal Storage” for both applications (and their data) and user content. Instead, these devices use either an external SD card for user content, or a corresponding area of internal memory to reproduce the functionality of an SD card. In such devices, there is a fixed limit between the application area (“/data”) and the user content area (“/sdcard”), with the result that user content can build up and reach this limit. The consequence of such a limit being reached, for example, for the camera application, would be that no new pictures could be taken even if there was still a considerable amount of free space in the application area (or in the user content area). In such an instance, the download and installation of new applications would also not be possible, even if there was enough free memory in the content area.

Note 2:
Some devices with integrated storage have abandoned the distinction between the application area and the content area when it comes to a Factory Data Reset. As a result, there is no option in such devices to perform a Factory Data Reset and preserve content. In such devices, all content is mandatorily and completely deleted from the device when a reset is performed.

In contrast, Sony Mobile’s memory integration solution makes it possible to preserve user content in this situation. Therefore, when performing a Factory Data Reset, the default action will still be to only remove applications and their data, and an option box must be checked if all content is to be removed as well (as might be desirable when selling the device second-hand, for instance).

Note 3:
For a developer, it is important to note that from a programming point of view the location names used to refer to the different memory areas described in Note 1 are still valid, i.e., the area used for applications ("/data") is still present, as is the area used for content ("/sdcard").

In reality, "sdcard" is a so-called "symbolic link" to "/data/media". However, from inside an Android application, "/sdcard" can still be used. For example, you can use "sdcard/DCIM/100Android" to find all camera images. The continued use of "/sdcard" to access the content area ensures compatibility across different products and Android releases in this regard.

Trademarks and acknowledgements

All product and company names mentioned herein are the trademarks or registered trademarks of their respective owners. Any rights not expressly granted herein are reserved. All other trademarks are property of their respective owners.

Visit *www.sonymobile.com* for more information.

SONY

White paper

June 2013

Xperia™ Z Ultra

C6806

Note: Screen images are simulated.

Purpose of this document

Sony™ product White papers are intended to give an overview of a product and provide details in relevant areas of technology.

Document history

Version		
June 2013	First released version	Version 1

Sony Mobile Developer World

For the latest technical documentation and development tools, go to *www.sonymobile.com/developer.*

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Product overview

Xperia™ Z Ultra – Big screen. Big entertainment.

- 6.44” HD Triluminos™ Display for mobile powered by X-Reality™ for mobile engine
- Ultra slim, waterproof and dust-resistant
- LTE & Qualcomm Snapdragon™ 800 quad-core 2.2 GHz processor
- Multi-task, write and sketch with any pencil
- Full accessory ecosystem for premium entertainment

Ultra large display

Built with the latest Sony BRAVIA technology, the Xperia™ Z Ultra is the first smartphone to incorporate Triluminos™ Display for mobile, for a wider palette of rich natural colours. This breakthrough technology includes X-Reality™* for mobile, Sony’s intelligent display technology which analyses each image to optimise colours, sharpness and contrast for vivid image quality whilst the super resolution feature reproduces lacking pixels for the sharpest videos.

** X-Reality™ for mobile will be available for this device through the forthcoming software upgrade available to download over the air. Sony Mobile will use reasonable endeavours to make this software available to end users in the week commencing September 9th, 2013 or as soon as possible thereafter. Software updates made available at different times depending on operator and country. Please check the version of software on your device as you may already have the latest software, depending on the date of purchase.*

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Watch movies, play games, read books and browse the web – with the Xperia™ Z Ultra’s extra-large HD screen. The superb sound quality of Sony’s ClearAudio+ and xLoud™ enhancement offers an exceptional hearing experience.

With the reader app, you can download your favourite e-books and enjoy them on your big screen. Through Sony’s media apps, you can discover the best way to enjoy and share photos, music and videos. And with a combination of Sony’s best technologies, you’ll get seamless access to online and offline content, for easy social sharing and endless discovery.

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Besides entertaining, the Xperia™ Z Ultra is an ideal business partner. The super responsive screen comes with handwriting recognition and is compatible with a stylus or even an ordinary pencil. You’ll always be ready to record your best ideas the moment they hit you. And the carbon-copy function allows you to memorise notes and sketches. The design of the Xperia™ Z Ultra paired with the easy-toggle keyboard makes one-handed input easy. And true multi-tasking and small apps mean that you don’t have to lose any valuable time browsing between windows, which helps you improve productivity.

Facts – dimensions, weight, performance and networks

Operating system	Google™ Android™ 4.2 (Jelly Bean)
Processor	2.2 GHz Qualcomm MSM8974 Quad Core
GPU	Adreno 330
Size	179.4x92.2x6.5 mm
Weight	212 grams
Available colours	Black White Purple
SIM card	Micro SIM
Main screen	
Colours	16,777,216 colour TFT
Resolution	1920x1080 pixels
Size (diagonal)	6.44 inches
Scratch-resistant	Shatterproof sheet on scratch-resistant glass
Input mechanisms	
Text input	On-screen QWERTY keyboard
Touch screen	Capacitive
Touch gesture	Yes – multi-touch, up to 10 fingers supported
Memory	
RAM	2 GB
Flash memory	Up to 16 GB*
Expansion slot	microSD™ card, up to 64 GB (SDXC supported)
Camera	
Camera resolution	8 MP
Digital zoom	16x
Video recording	Yes – HD 1080p
Front Camera	Yes – HD 1080p for video chat and 2 MP for camera capture
Sensors	
Accelerometer	Yes
Proximity sensor	Yes
Ambient light sensor	Yes

Magnetometer	Yes
Gyroscope	Yes
Networks	
C6806	UMTS HSPA+ 850 (Band V), 900 (Band VIII), 1700 (Band IV), 1900 (Band II), 2100 (Band I) MHz GSM GPRS/EDGE 850, 900, 1800, 1900 MHz LTE (Bands I, II, IV, V, VII, VIII, XVII)
Data transfer speeds	
GSM GPRS	Up to 107 kbps
GSM EDGE	Up to 296 kbps
HSUPA (upload)	Cat 6, up to 5.8 Mbps
HSDPA (download)	Cat 24, up to 42 Mbps
LTE (upload)	Cat 4, up to 50 Mbps
LTE (download)	Cat 4, up to 150 Mbps
Talk time (GSM)	Up to 11 hours**
Standby time (GSM)	Up to 550 hours**
Talk time (UMTS)	Up to 14 hours**
Standby time (UMTS)	Up to 530 hours**
Standby time (LTE)	Up to 510 hours**
Music listening time	Up to 120 hours**
Video playback time	Up to 5.5 hours**
Battery (Embedded)	3050 mAh typical 3000 mAh minimum

** Memory comprises approximately 5 GB of firmware plus 11 GB of "Internal storage" for music, pictures and movies, and downloaded applications and their data. For more details about memory, See "Memory in Android™ devices" on page 16.*

*** Values are according to GSM Association Battery Life Measurement Technique as performed in controlled laboratory conditions. Actual time may vary.*

NOTE: Battery performance may vary depending on network conditions and configurations, and phone usage.

NOTE: All performance metrics are measured under laboratory conditions.

Categorised feature list

Camera

8 megapixel camera
16x digital zoom
Auto focus
Burst mode
HDR for pictures and movies
Face detection
Front-facing camera (2 MP 1080p)
Geotagging
HD video recording (1080p)
Image stabiliser
Object tracking
Picture Effect
Quick Launch
Scene recognition
Self-timer
Send to web
Smile Shutter™
Sony Exmor RS® for mobile
Image sensor
Superior Auto
Sweep Panorama
Touch capture
Touch focus
White balance

Music

3D Surround Sound (VPT)
Album art
Bluetooth® stereo (aptX®, A2DP)
ClearAudio+
Clear Bass
Clear Phase™
Clear stereo
Dynamic normalizer
Music tones (MP3/AAC)
PlayNow™ service*
SensMe™
TrackID™ music recognition*
“WALKMAN” application
xLoud™ Experience

Internet

Bookmarks
Google Chrome™
Google Play™
Google™ search*
Google Voice™ Search*
Google Maps™ for Mobile with Street view and Latitude™*
NeoReader™ barcode scanner*
Pan & zoom

Communication

Call list
Facebook™ application*
Google Talk™ application*
Noise suppression
Polyphonic ringtones
Speakerphone
Twitter™ application*

Messaging

Conversations
Email
Google Mail™*
Handwriting recognition
Instant messaging
Multimedia messaging (MMS)
Predictive text input
Sound recorder
Text messaging (SMS)
Voice input

Design

Auto rotation
Face Unlock
Gesture input
IPX5 and IPX8 (Waterproof) & IP5X (Dust-resistant)
On-screen QWERTY keyboard
Pen input with stylus
Sensor-on-lens
STAMINA mode
Screenshot capturing
Throw
Triluminos™ Display for mobile
Touchscreen
X-Reality™ for mobile
Wallpaper

Entertainment

3D games
Media browser
Motion gaming
PlayMemories
PlayStation® Certified**
Radio (FM radio with RDS)
Reader mode
SensMe™ slideshow
Sony Entertainment Network*
TV launcher
Video streaming
YouTube™*

Organiser

Airplane mode
Alarm clock
Calculator
Calendar
Contacts
Document readers
eCompass™
Notes
Setup guide
Stopwatch
Tasks
Timer

Connectivity

3.5 mm audio jack (CTIA)
ANT+ sport fitness
aGPS*
Bluetooth® 4.0 wireless technology
DLNA Certified®
GLONASS
MHL support
Media Go™
Media Transfer Protocol support
Micro USB support
Native USB tethering
NFC
PC Companion
Screen mirroring
Synchronisation via Exchange ActiveSync®
Synchronisation via Facebook™
Synchronisation via Google™
Synchronisation via SyncML™
USB charging
USB High speed 2.0 support
Xperia Link™
Wi-Fi®
Wi-Fi® Hotspot functionality

** This service is not available in all markets.*

*** This service is not available at the time of launch.*

Technologies in detail

NOTE: The information outlined below is general and levels of compliance to standards and specifications may vary between products and markets. For more information, contact Sony Mobile Developer World or your Sony contact person where applicable.

Device-to-device communications (local)

Bluetooth® wireless technology

Bluetooth® profiles supported	Advanced Audio Distribution Profile v1.2 (A2DP) Audio/Video Remote Control Profile v1.3 Device Identification Profile v1.3 Generic Attribute Profile Client/Server over LE Handsfree Profile v1.6 (Wide band speech) Headset Profile v1.2 Health Device Profile v1.1 Human Interface Device Profile, Host role v1.1 Messaging Access Profile v1.0 Object Push Profile v1.1 Personal Area Networking Profile v1.0 Phonebook Access Profile v1.1 Proximity Monitor Profile over LE v1.0 Serial Port Profile v1.1
Core version and supported core features	Version 4.0
Other supported features	aptX® CD quality audio streaming over Bluetooth®
Connectable devices	Products support at least one of the Bluetooth® profiles above. Bluetooth® 4.0 accessories generally require installation of a supporting application.

More information:

www.sonymobile.com/developer

www.bluetooth.com

Wi-Fi®

Supported standards	IEEE 802.11a/b/g/n/ac and Wi-Fi® Wi-Fi Direct, Wi-Fi Protected Setup
Connectable devices	Wi-Fi® access points Wi-Fi Direct compatible devices
Frequency band	2.4 GHz/5 GHz
Data transfer rate	Up to 325 Mbit/s
Security	Open Authentication Shared Authentication EAP-SIM EAP-AKA EAP-TLS EAP-TTLS/MSCHAPv2 PEAPv0/EAP-MSCHAPv2 PEAPv1/EAP-GTC WPA Personal and WPA2 Personal WPA Enterprise and WPA2 Enterprise
Encryption	WEP 64 bit, WEP 128 bit, TKIP and CCMP (AES)
Power save	WMM-UAPSD
QoS	WMM

DLNA Certified® (Digital Living Network Alliance)

Supported Device Classes	**M-DMS – Mobile Digital Media Server** Media Types: images, music and video Summary: The digital media server exposes the media files in your phone to a Wi-Fi® network. The files can then be accessed from other DLNA Certified® clients. **+PU+** Media Types: image, video and music Summary: Play media in the phone on another device, such as a TV or computer using 2 box push technology. +PU+ is integrated in the Album, Movies and “Walkman” applications. **M-DMP – Mobile Digital Media Player** Media Types: image, video and music Summary: Play content stored on another device, for example, a server or a PC, directly on the phone. **+DN+** Media Types: video and music Summary: Download content stored on another device, for example, a server or a PC, and play the downloaded content directly on the phone.
Supported Bearers	Wi-Fi® Wi-Fi® Direct
DRM Support	The DLNA Certified® implementation does not support DRM-protected content. DTCP-IP is supported for Japanese product.

Messaging

MMS (Multimedia Messaging Service)

According to OMA Multimedia Messaging Service v1.0 + SMIL

Email

Bearer type (IP)	GPRS, EGPRS, UMTS
Character sets	BIG5 Traditional Chinese GB18030 ISO-2022-JP Japanese ISO-8859-1 ISO-8859-2 Eastern Europe ISO-8859-5 Cyrillic ISO-8859-7 Greek ISO-8859-9 Turkish ISO 8859-11 KOI8-R Cyrillic Shift_JIS Japanese US-ASCII UTF-16 UTF-8 Windows® 874 Windows® 1251 Cyrillic Windows® 1252 Windows® 1254 Turkish Windows® 1258 Vietnamese
Protocols	POP3 and IMAP4
Push email	Microsoft® Exchange ActiveSync® (EAS)
Secure email	SSL/TLS, both port methods (POPS/IMAPS) and STARTTLS
HTML mail	Yes (read only)

More information:

www.sonymobile.com/developer

www.openmobilealliance.org

Positioning – location based services

Supported standards:

- OMA Secure User Plane Location (SUPL) v1.0 & v2.0
- 3GPP™ Control Plane location (incl. Emergency location)
- Qualcomm® GPSOneXtra™

Supported satellite systems:

- GPS
- GLONASS

NOTE*:* GPS and GLONASS are used together to calculate the position. Positioning is more robust and accurate in most conditions if both systems are active. The benefits of using GLONASS are automatically available for all applications using the Satellite Positioning API (referred to "GPS Provider" in Android terminology).

Provisioning (OMA CP)

OMA CP version 1.1

Multimedia (audio, image and video)

Audio Playback	**Decoder format**	**Supported in file format**
	MP3	MP3 (.mp3)
	AAC (AAC-LC, AAC+, eAAC+)	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a), ADTS (.aac)
	AMR-NB, AMR-WB	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4a), AMR (.amr, .awb)
	MIDI	SMF (.mid), XMF (.xmf), Mobile XMF (.mxmf), OTA (.ota), RTTTL (.rtttl), RTX (.rtx), iMelody (imy)
	PCM	WAV (.wav)
	OTA	OTA (.ota)
	Vorbis	OGG (.ogg)
	FLAC	FLAC (.flac)
Audio Recording	**Encoder format**	**Supported in file format**
	AMR (AMR-NB, AMR-WB)	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a), AMR (.amr)
	AAC	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
Image Playback	**Decoder format**	**Supported in file format**
	Windows bitmap	BMP (.bmp)
	GIF	GIF (.gif)
	JPEG	JPEG (.jpg, .jpeg)
	PNG	PNG (.png)
	Wireless Bitmap	WBMP (.wbmp)
	WebP	WebP (.webp)
Image Capture	**Encoder format**	**Supported in file format**
	JPEG	JPEG (.jpg)

Video Playback	**Decoder format**	**Supported in file format**
	MPEG-4	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv), AVI (.avi), Xvid (.xvid)
	MPEG-2 (only for Japanese market)	MPEG2-TS (.ts)
	H.264	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv), MPEG2-TS (.ts)
	H.263	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v)
	VP8	Webm (.webm, .mkv)
Video Recording	**Encoder format**	**Supported in file format**
	H.264	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
	H.263	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
	MPEG-4	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
Audio/Video Streaming	Streaming transport	RTSP HTTP progressive download HLS
DRM	DRM (Digital Rights Management) – features the rights and copy protection of downloaded content	OMA DRM v1.0 Marlin DRM Widevine Level 3 PlayReady DRM (available in specific regions)

Synchronisation (OMA DS, EAS, Google Sync™)

OMA Data Synchronisation protocol versions 1.1.2 and 1.2

OMA Data Formats: vCard 2.1, vCalendar 1.0

Microsoft® Exchange ActiveSync® protocol version 2.5

Microsoft® Exchange ActiveSync® protocol version 12

Microsoft® Exchange ActiveSync® protocol version 12.1

Microsoft® Exchange ActiveSync® protocol version 14

Microsoft® Exchange ActiveSync® protocol version 14.1

Google Sync™

Related information:

www.sonymobile.com/developer

Web browser

Google Chrome™ for Android™ is pre-installed.*

Related information:

https://play.google.com/store/apps/details?id=com.android.chrome

* Google *Chrome™ is not available for all markets.*

Memory in Android™ devices

To use Android devices efficiently, users should be aware of the different types of device memory. This knowledge is important in order to understand, for example, where music, photos and videos are saved; how many apps can be downloaded from Google Play™; and how photos can be copied to a PC.

The below information is also of interest to developers who want to optimise their programs to make the best possible use of the resources in the device.

Generally, all Android devices share the same basic memory setup. What differs is how much memory is available to you via the different types of memory, and whether your device uses an external SD card or an internal memory chip. Any information specific to the particular device model described in this White Paper is noted as such.

Types of memory

The types of memory described and numbered below are consistent with the terminology used in Sony mobile device menus and in other content relating to 2013 Xperia™ devices:

1. **Dynamic Memory** (also known as RAM) is used by applications that run when the device is turned on. The amount of Dynamic Memory influences how many applications and operating system services can run at the same time. The Android operating system automatically closes applications and services that are not being used.

   However, such automatic functionality has limits. For example, if a lower amount of free RAM is available to applications after a new release of the operating system (due to increased capabilities in the system), device speed will eventually be impacted. This is the main reason that a device cannot be indefinitely upgraded to newer releases of Android™.

   If you experience problems with RAM, for example, if the device runs slower than usual or if the Home application restarts frequently when you leave an application, you should minimise the use of apps that run all the time. Such apps could include, for example, applications that frequently download social networking service updates. You could also consider using a static wallpaper instead of a live wallpaper.

   To see which apps and services are currently active, go to **Settings > Applications > Running Services**. You should have at least 50 MB, and ideally 100 MB or more, of free RAM to avoid slowdowns and application restarts.

   You should also be aware that if you update the device to a later Android release, the load on the built-in Dynamic Memory will increase due to the addition of more features, as mentioned above. As a result, the device may run slower after an update.

   The Xperia™ Z Ultra has about 2 GB of RAM available to the Android OS and applications, of which about 200 MB is already used out of the box.

2. **System Memory** (also known as “System partition” or “/system”) is used for the Android OS and for most applications that are pre-loaded from the factory. This type of memory is normally locked, and can only be changed through a firmware upgrade. There is usually some free space available in this section of memory. However, since it is locked, you cannot save apps, photos or any other content to this memory. System Memory is reserved for future firmware upgrades, which almost always need more memory than the original firmware. You cannot see or influence the use of this memory.

3. **Internal Storage** is memory used as” working” memory. It can be compared to the C: drive on a PC or to the startup disk on a Mac.

This type of memory is used to store all application downloaded from the Google Play™ Store (and other sources) as well as their settings and data (such as emails, messages and calendar events, for example). All applications have an allocated area which no other applications can access and where the application data can be stored.

Some game applications also store content such as game music and game level information outside their own designated area. In most cases, an application can choose to save its data in a location of its own choosing (outside the protected application settings area). Generally, such content is not deleted when an application is uninstalled; it must be removed manually by connecting the device to a computer with a USB cable, or by using a file manager application.

Internal Storage is also used for all user content added, for example, as a result of the user taking photos with the camera, downloading media files, and performing file transfers. Typical user content includes:

- photos
- movies
- music
- downloaded documents (as email attachments, for example)

Internal Storage will tend to fill up as a result of normal usage. Examples of such usage are the saving of data by applications; the downloading and installation of new applications; the downloading of free or paid content; and the shooting of pictures and movies. Therefore, the larger this memory is from the start, the more applications you can download and use, and the more pictures and movies you can shoot.

If the Internal Storage starts to get full, the device slows down, and in some cases it might no longer be possible to install more apps. You should always ensure that you have at least 100 MB of free Internal Storage. If not, you should consider removing some apps that you seldom use, or move content that you do not frequently access to safe storage.

You can see approximately how much Internal Storage is free in **Settings** > **Storage** >**Internal Storage**. You can also view more detail about how much memory is used by applications in **Settings** > **Applications** > **Manage Applications**. In the Xperia™ Z Ultra, about 11 GB of Internal Storage is available out of the box.

Please note that in Sony Mobile 2013 products, “Internal Storage” is now the combination of what was previously known as “Device Memory” or “Phone Memory” (for applications and their data – also previously known as “/data”) and “Internal Storage” (for user’s content – also previously known as “/sdcard”). The reason for this change is to make the use of available memory more flexible, and also to enable the optional encryption of user’s content.

Memory card slot

In some products you may find both a large internal memory and a memory card reader slot. However, on the current Android platform, the card reader slot does not work in the same manner in a device with a large internal memory as it does in a device with ONLY a memory card slot.

Generally, since most applications expect only a single location for storage, such applications will not generally allow you to SAVE anything to the memory card (i.e., they do not offer the option to choose a storage location). However, some applications (for instance, the Sony Mobile “Camera” application) may actually allow you to do so. Other applications, for example, backup applications such as the Sony Mobile “Memory” application, will by definition be configured to copy content from the Internal Storage to the external SD card.

On the other hand, when it comes to reading from an external SD Card, you will be able to access content (for example, videos, photos and music) on a memory card inserted in this slot without any special consideration since the Android system searches all available memory for content. Therefore, such products may be regarded as supporting a fourth type of memory, called “External Card” or “SD Card”.

4. **SD Card** (known as “/ext_card” from a programmer’s point of view, or by other names in other Android products) is the name for the removable SD memory card in all 2013 Sony Mobile products. As described above, this External Card memory is generally more limited in that any application can read from it, but many applications cannot save to this card. Only a few applications, including backup applications and file manger applications, have the capability to save to this card.

Backing up data to different memory types
Generally, you should not save photos, videos and other personal content solely on the internal memory of a device. If something should happen with the hardware, or if the device is lost or stolen, the data stored on the device’s internal memory is gone forever.

In a device where an SD card reader is the main memory, it is relatively easy to take the card out and copy all content to a PC or Mac, or to an entertainment device with a memory card slot. In a product featuring Internal Storage as the main memory, it is not possible to physically remove the memory. Instead, any critical or high-value content must either be copied to an external SD card by a special backup application, transferred to remote storage over a network (mobile or Wi-Fi), or to a computer via a USB cable.

To facilitate the transfer of data via a cable, the Xperia™ Z Ultra supports the Microsoft standard, Media Transfer Protocol (MTP), which makes it possible to easily transfer content back and forth between your device and a Windows PC. For Apple Mac computers, a special application called Sony Bridge for Mac is available with built-in support for MTP. This application can be downloaded from the Xperia™ Z Ultra Support page.

Note that you do not need to back up or make a copy of applications that you have downloaded from the Google Play™ Store. They can normally be downloaded again after you have set up your Google account to work in a new device (or in a device where the memory has been completely erased).

Note 1:
As noted above, some Android devices, including Sony Mobile devices from 2012 and Sony Ericsson devices from 2011 and earlier, do not use a single “Internal Storage” for both applications (and their data) and user content. Instead, these devices use either an external SD card for user content, or a corresponding area of internal memory to reproduce the functionality of an SD card. In such devices, there is a fixed limit between the application area (“/data”) and the user content area (“/sdcard”), with the result that user content can build up and reach this limit. The consequence of such a limit being reached, for example, for the camera application, would be that no new pictures could be taken even if there was still a considerable amount of free space in the application area (or in the user content area). In such an instance, the download and installation of new applications would also not be possible, even if there was enough free memory in the content area.

Note 2:
Some devices with integrated storage have abandoned the distinction between the application area and the content area when it comes to a Factory Data Reset. As a result, there is no option in such devices to perform a Factory Data Reset and preserve content. In such devices, all content is mandatorily and completely deleted from the device when a reset is performed.

In contrast, Sony Mobile’s memory integration solution makes it possible to preserve user content in this situation. Therefore, when performing a Factory Data Reset, the default action will still be to only remove applications and their data, and an option box must be checked if all content is to be removed as well (as might be desirable when selling the device second-hand, for instance).

Note 3:
For a developer, it is important to note that from a programming point of view the location names used to refer to the different memory areas described in Note 1 are still valid, i.e., the area used for applications ("/data") is still present, as is the area used for content ("/sdcard").

In reality, "sdcard" is a so-called "symbolic link" to "/data/media". However, from inside an Android application, "/sdcard" can still be used. For example, you can use "sdcard/DCIM/100Android" to find all camera images. The continued use of "/sdcard" to access the content area ensures compatibility across different products and Android releases in this regard.

Trademarks and acknowledgements

All product and company names mentioned herein are the trademarks or registered trademarks of their respective owners. Any rights not expressly granted herein are reserved. All other trademarks are property of their respective owners.

Visit *www.sonymobile.com* for more information.

SONY

White paper

June 2013

Xperia™ Z Ultra

C6833

Note: Screen images are simulated.

Purpose of this document

Sony™ product White papers are intended to give an overview of a product and provide details in relevant areas of technology.

Document history

Version		
June 2013	First released version	Version 1

Sony Mobile Developer World

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Product overview

Xperia™ Z Ultra – Big screen. Big entertainment.

- 6.44” HD Triluminos™ Display for mobile powered by X-Reality™ for mobile engine
- Ultra slim, waterproof and dust-resistant
- LTE & Qualcomm Snapdragon™ 800 quad-core 2.2 GHz processor
- Multi-task, write and sketch with any pencil
- Full accessory ecosystem for premium entertainment

Ultra large display

Built with the latest Sony BRAVIA technology, the Xperia™ Z Ultra is the first smartphone to incorporate Triluminos™ Display for mobile, for a wider palette of rich natural colours. This breakthrough technology includes X-Reality™* for mobile, Sony’s intelligent display technology which analyses each image to optimise colours, sharpness and contrast for vivid image quality whilst the super resolution feature reproduces lacking pixels for the sharpest videos.

** X-Reality™ for mobile will be available for this device through the forthcoming software upgrade available to download over the air. Sony Mobile will use reasonable endeavours to make this software available to end users in the week commencing September 9th, 2013 or as soon as possible thereafter. Software updates made available at different times depending on operator and country. Please check the version of software on your device as you may already have the latest software, depending on the date of purchase.*

Ultra entertainment

Watch movies, play games, read books and browse the web – with the Xperia™ Z Ultra’s extra-large HD screen. The superb sound quality of Sony’s ClearAudio+ and xLoud™ enhancement offers an exceptional hearing experience.

With the reader app, you can download your favourite e-books and enjoy them on your big screen. Through Sony’s media apps, you can discover the best way to enjoy and share photos, music and videos. And with a combination of Sony’s best technologies, you’ll get seamless access to online and offline content, for easy social sharing and endless discovery.

Ultra business

Besides entertaining, the Xperia™ Z Ultra is an ideal business partner. The super responsive screen comes with handwriting recognition and is compatible with a stylus or even an ordinary pencil. You’ll always be ready to record your best ideas the moment they hit you. And the carbon-copy function allows you to memorise notes and sketches. The design of the Xperia™ Z Ultra paired with the easy-toggle key-board makes one-handed input easy. And true multi-tasking and small apps mean that you don’t have to lose any valuable time browsing between windows, which helps you improve productivity.

Facts – dimensions, weight, performance and networks

Operating system	Google™ Android™ 4.2 (Jelly Bean)
Processor	2.2 GHz Qualcomm MSM8974 Quad Core
GPU	Adreno 330
Size	179.4x92.2x6.5 mm
Weight	212 grams
Available colours	Black White Purple
SIM card	Micro SIM
Main screen	
Colours	16,777,216 colour TFT
Resolution	1920x1080 pixels
Size (diagonal)	6.44 inches
Scratch-resistant	Shatterproof sheet on scratch-resistant glass
Input mechanisms	
Text input	On-screen QWERTY keyboard
Touch screen	Capacitive
Touch gesture	Yes – multi-touch, up to 10 fingers supported
Memory	
RAM	2 GB
Flash memory	Up to 16 GB*
Expansion slot	microSD™ card, up to 64 GB (SDXC supported)
Camera	
Camera resolution	8 MP
Digital zoom	16x
Video recording	Yes – HD 1080p
Front Camera	Yes – HD 1080p for video chat and 2 MP for camera capture
Sensors	
Accelerometer	Yes
Proximity sensor	Yes
Ambient light sensor	Yes

Magnetometer	Yes
Gyroscope	Yes
Networks	
C6833	UMTS HSPA+ 850 (Band V), 900 (Band VIII), 1700 (Band IV), 1900 (Band II), 2100 (Band I) MHz GSM GPRS/EDGE 850, 900, 1800, 1900 MHz LTE (Bands I, II, III, IV, V, VII, VIII, XX)
Data transfer speeds	
GSM GPRS	Up to 107 kbps
GSM EDGE	Up to 296 kbps
HSUPA (upload)	Cat 6, up to 5.8 Mbps
HSDPA (download)	Cat 24, up to 42 Mbps
LTE (upload)	Cat 4, up to 50 Mbps
LTE (download)	Cat 4, up to 150 Mbps
Talk time (GSM)	Up to 11 hours**
Standby time (GSM)	Up to 550 hours**
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Object tracking
Picture Effect
Quick Launch
Scene recognition
Self-timer
Send to web
Smile Shutter™
Sony Exmor RS® for mobile
Image sensor
Superior Auto
Sweep Panorama
Touch capture
Touch focus
White balance

Music

3D Surround Sound (VPT)
Album art
Bluetooth® stereo (aptX®, A2DP)
ClearAudio+
Clear Bass
Clear Phase™
Clear stereo
Dynamic normalizer
Music tones (MP3/AAC)
PlayNow™ service*
SensMe™
TrackID™ music recognition*
“WALKMAN” application
xLoud™ Experience

Internet

Bookmarks
Google Chrome™
Google Play™
Google™ search*
Google Voice™ Search*
Google Maps™ for Mobile with Street view and Latitude™*
NeoReader™ barcode scanner*
Pan & zoom

Communication

Call list
Facebook™ application*
Google Talk™ application*
Noise suppression
Polyphonic ringtones
Speakerphone
Twitter™ application*

Messaging

Conversations
Email
Google Mail™*
Handwriting recognition
Instant messaging
Multimedia messaging (MMS)
Predictive text input
Sound recorder
Text messaging (SMS)
Voice input

Design

Auto rotation
Face Unlock
Gesture input
IPX5 and IPX8 (Waterproof) & IP5X (Dust-resistant)
On-screen QWERTY keyboard
Pen input with stylus
Sensor-on-lens
STAMINA mode
Screenshot capturing
Throw
Triluminos™ Display for mobile
Touchscreen
X-Reality™ for mobile
Wallpaper

Entertainment

3D games
Media browser
Motion gaming
PlayMemories
PlayStation® Certified**
Radio (FM radio with RDS)
Reader mode
SensMe™ slideshow
Sony Entertainment Network*
TV launcher
Video streaming
YouTube™*

Organiser

Airplane mode
Alarm clock
Calculator
Calendar
Contacts
Document readers
eCompass™
Notes
Setup guide
Stopwatch
Tasks
Timer

Connectivity

3.5 mm audio jack (CTIA)
ANT+ sport fitness
aGPS*
Bluetooth® 4.0 wireless technology
DLNA Certified®
GLONASS
MHL support
Media Go™
Media Transfer Protocol support
Micro USB support
Native USB tethering
NFC
PC Companion
Screen mirroring
Synchronisation via Exchange ActiveSync®
Synchronisation via Facebook™
Synchronisation via Google™
Synchronisation via SyncML™
USB charging
USB High speed 2.0 support
Xperia Link™
Wi-Fi®
Wi-Fi® Hotspot functionality

** This service is not available in all markets.*

*** This service is not available at the time of launch.*

Technologies in detail

NOTE: The information outlined below is general and levels of compliance to standards and specifications may vary between products and markets. For more information, contact Sony Mobile Developer World or your Sony contact person where applicable.

Device-to-device communications (local)

Bluetooth® wireless technology

Bluetooth® profiles supported	Advanced Audio Distribution Profile v1.2 (A2DP) Audio/Video Remote Control Profile v1.3 Device Identification Profile v1.3 Generic Attribute Profile Client/Server over LE Handsfree Profile v1.6 (Wide band speech) Headset Profile v1.2 Health Device Profile v1.1 Human Interface Device Profile, Host role v1.1 Messaging Access Profile v1.0 Object Push Profile v1.1 Personal Area Networking Profile v1.0 Phonebook Access Profile v1.1 Proximity Monitor Profile over LE v1.0 Serial Port Profile v1.1
Core version and supported core features	Version 4.0
Other supported features	aptX® CD quality audio streaming over Bluetooth®
Connectable devices	Products support at least one of the Bluetooth® profiles above. Bluetooth® 4.0 accessories generally require installation of a supporting application.

More information:

www.sonymobile.com/developer

www.bluetooth.com

Wi-Fi®

Supported standards	IEEE 802.11a/b/g/n/ac and Wi-Fi® Wi-Fi Direct, Wi-Fi Protected Setup
Connectable devices	Wi-Fi® access points Wi-Fi Direct compatible devices
Frequency band	2.4 GHz/5 GHz
Data transfer rate	Up to 325 Mbit/s
Security	Open Authentication Shared Authentication EAP-SIM EAP-AKA EAP-TLS EAP-TTLS/MSCHAPv2 PEAPv0/EAP-MSCHAPv2 PEAPv1/EAP-GTC WPA Personal and WPA2 Personal WPA Enterprise and WPA2 Enterprise
Encryption	WEP 64 bit, WEP 128 bit, TKIP and CCMP (AES)
Power save	WMM-UAPSD
QoS	WMM

DLNA Certified® (Digital Living Network Alliance)

Supported Device Classes	**M-DMS – Mobile Digital Media Server** Media Types: images, music and video Summary: The digital media server exposes the media files in your phone to a Wi-Fi® network. The files can then be accessed from other DLNA Certified® clients. **+PU+** Media Types: image, video and music Summary: Play media in the phone on another device, such as a TV or computer using 2 box push technology. +PU+ is integrated in the Album, Movies and “Walkman” applications. **M-DMP – Mobile Digital Media Player** Media Types: image, video and music Summary: Play content stored on another device, for example, a server or a PC, directly on the phone. **+DN+** Media Types: video and music Summary: Download content stored on another device, for example, a server or a PC, and play the downloaded content directly on the phone.
Supported Bearers	Wi-Fi® Wi-Fi® Direct
DRM Support	The DLNA Certified® implementation does not support DRM-protected content. DTCP-IP is supported for Japanese product.

Messaging

MMS (Multimedia Messaging Service)

According to OMA Multimedia Messaging Service v1.0 + SMIL

Email

Bearer type (IP)	GPRS, EGPRS, UMTS
Character sets	BIG5 Traditional Chinese GB18030 ISO-2022-JP Japanese ISO-8859-1 ISO-8859-2 Eastern Europe ISO-8859-5 Cyrillic ISO-8859-7 Greek ISO-8859-9 Turkish ISO 8859-11 KOI8-R Cyrillic Shift_JIS Japanese US-ASCII UTF-16 UTF-8 Windows® 874 Windows® 1251 Cyrillic Windows® 1252 Windows® 1254 Turkish Windows® 1258 Vietnamese
Protocols	POP3 and IMAP4
Push email	Microsoft® Exchange ActiveSync® (EAS)
Secure email	SSL/TLS, both port methods (POPS/IMAPS) and STARTTLS
HTML mail	Yes (read only)

More information:

www.sonymobile.com/developer

www.openmobilealliance.org

Positioning – location based services

Supported standards:

- OMA Secure User Plane Location (SUPL) v1.0 & v2.0
- 3GPP™ Control Plane location (incl. Emergency location)
- Qualcomm® GPSOneXtra™

Supported satellite systems:

- GPS
- GLONASS

NOTE*:* GPS and GLONASS are used together to calculate the position. Positioning is more robust and accurate in most conditions if both systems are active. The benefits of using GLONASS are automatically available for all applications using the Satellite Positioning API (referred to "GPS Provider" in Android terminology).

Provisioning (OMA CP)

OMA CP version 1.1

Multimedia (audio, image and video)

Audio Playback	**Decoder format**	**Supported in file format**
	MP3	MP3 (.mp3)
	AAC (AAC-LC, AAC+, eAAC+)	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a), ADTS (.aac)
	AMR-NB, AMR-WB	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4a), AMR (.amr, .awb)
	MIDI	SMF (.mid), XMF (.xmf), Mobile XMF (.mxmf), OTA (.ota), RTTTL (.rtttl), RTX (.rtx), iMelody (imy)
	PCM	WAV (.wav)
	OTA	OTA (.ota)
	Vorbis	OGG (.ogg)
	FLAC	FLAC (.flac)
Audio Recording	**Encoder format**	**Supported in file format**
	AMR (AMR-NB, AMR-WB)	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a), AMR (.amr)
	AAC	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
Image Playback	**Decoder format**	**Supported in file format**
	Windows bitmap	BMP (.bmp)
	GIF	GIF (.gif)
	JPEG	JPEG (.jpg, .jpeg)
	PNG	PNG (.png)
	Wireless Bitmap	WBMP (.wbmp)
	WebP	WebP (.webp)
Image Capture	**Encoder format**	**Supported in file format**
	JPEG	JPEG (.jpg)

Video Playback	**Decoder format**	**Supported in file format**
	MPEG-4	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv), AVI (.avi), Xvid (.xvid)
	MPEG-2 (only for Japanese market)	MPEG2-TS (.ts)
	H.264	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv), MPEG2-TS (.ts)
	H.263	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v)
	VP8	Webm (.webm, .mkv)
Video Recording	**Encoder format**	**Supported in file format**
	H.264	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
	H.263	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
	MPEG-4	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
Audio/Video Streaming	Streaming transport	RTSP HTTP progressive download HLS
DRM	DRM (Digital Rights Management) – features the rights and copy protection of downloaded content	OMA DRM v1.0 Marlin DRM Widevine Level 3 PlayReady DRM (available in specific regions)

Synchronisation (OMA DS, EAS, Google Sync™)

OMA Data Synchronisation protocol versions 1.1.2 and 1.2

OMA Data Formats: vCard 2.1, vCalendar 1.0

Microsoft® Exchange ActiveSync® protocol version 2.5

Microsoft® Exchange ActiveSync® protocol version 12

Microsoft® Exchange ActiveSync® protocol version 12.1

Microsoft® Exchange ActiveSync® protocol version 14

Microsoft® Exchange ActiveSync® protocol version 14.1

Google Sync™

Related information:

www.sonymobile.com/developer

Web browser

Google Chrome™ for Android™ is pre-installed.*

Related information:

https://play.google.com/store/apps/details?id=com.android.chrome

* Google *Chrome™ is not available for all markets.*

Memory in Android™ devices

To use Android devices efficiently, users should be aware of the different types of device memory. This knowledge is important in order to understand, for example, where music, photos and videos are saved; how many apps can be downloaded from Google Play™; and how photos can be copied to a PC.

The below information is also of interest to developers who want to optimise their programs to make the best possible use of the resources in the device.

Generally, all Android devices share the same basic memory setup. What differs is how much memory is available to you via the different types of memory, and whether your device uses an external SD card or an internal memory chip. Any information specific to the particular device model described in this White Paper is noted as such.

Types of memory

The types of memory described and numbered below are consistent with the terminology used in Sony mobile device menus and in other content relating to 2013 Xperia™ devices:

1. **Dynamic Memory** (also known as RAM) is used by applications that run when the device is turned on. The amount of Dynamic Memory influences how many applications and operating system services can run at the same time. The Android operating system automatically closes applications and services that are not being used.

   However, such automatic functionality has limits. For example, if a lower amount of free RAM is available to applications after a new release of the operating system (due to increased capabilities in the system), device speed will eventually be impacted. This is the main reason that a device cannot be indefinitely upgraded to newer releases of Android™.

   If you experience problems with RAM, for example, if the device runs slower than usual or if the Home application restarts frequently when you leave an application, you should minimise the use of apps that run all the time. Such apps could include, for example, applications that frequently download social networking service updates. You could also consider using a static wallpaper instead of a live wallpaper.

   To see which apps and services are currently active, go to **Settings > Applications > Running Services**. You should have at least 50 MB, and ideally 100 MB or more, of free RAM to avoid slowdowns and application restarts.

   You should also be aware that if you update the device to a later Android release, the load on the built-in Dynamic Memory will increase due to the addition of more features, as mentioned above. As a result, the device may run slower after an update.

   The Xperia™ Z Ultra has about 2 GB of RAM available to the Android OS and applications, of which about 200 MB is already used out of the box.

2. **System Memory** (also known as “System partition” or “/system”) is used for the Android OS and for most applications that are pre-loaded from the factory. This type of memory is normally locked, and can only be changed through a firmware upgrade. There is usually some free space available in this section of memory. However, since it is locked, you cannot save apps, photos or any other content to this memory. System Memory is reserved for future firmware upgrades, which almost always need more memory than the original firmware. You cannot see or influence the use of this memory.

3. **Internal Storage** is memory used as” working” memory. It can be compared to the C: drive on a PC or to the startup disk on a Mac.

This type of memory is used to store all application downloaded from the Google Play™ Store (and other sources) as well as their settings and data (such as emails, messages and calendar events, for example). All applications have an allocated area which no other applications can access and where the application data can be stored.

Some game applications also store content such as game music and game level information outside their own designated area. In most cases, an application can choose to save its data in a location of its own choosing (outside the protected application settings area). Generally, such content is not deleted when an application is uninstalled; it must be removed manually by connecting the device to a computer with a USB cable, or by using a file manager application.

Internal Storage is also used for all user content added, for example, as a result of the user taking photos with the camera, downloading media files, and performing file transfers. Typical user content includes:

- photos
- movies
- music
- downloaded documents (as email attachments, for example)

Internal Storage will tend to fill up as a result of normal usage. Examples of such usage are the saving of data by applications; the downloading and installation of new applications; the downloading of free or paid content; and the shooting of pictures and movies. Therefore, the larger this memory is from the start, the more applications you can download and use, and the more pictures and movies you can shoot.

If the Internal Storage starts to get full, the device slows down, and in some cases it might no longer be possible to install more apps. You should always ensure that you have at least 100 MB of free Internal Storage. If not, you should consider removing some apps that you seldom use, or move content that you do not frequently access to safe storage.

You can see approximately how much Internal Storage is free in **Settings** > **Storage** >**Internal Storage**. You can also view more detail about how much memory is used by applications in **Settings** > **Applications** > **Manage Applications**. In the Xperia™ Z Ultra, about 11 GB of Internal Storage is available out of the box.

Please note that in Sony Mobile 2013 products, “Internal Storage” is now the combination of what was previously known as “Device Memory” or “Phone Memory” (for applications and their data – also previously known as “/data”) and “Internal Storage” (for user’s content – also previously known as “/sdcard”). The reason for this change is to make the use of available memory more flexible, and also to enable the optional encryption of user’s content.

Memory card slot

In some products you may find both a large internal memory and a memory card reader slot. However, on the current Android platform, the card reader slot does not work in the same manner in a device with a large internal memory as it does in a device with ONLY a memory card slot.

Generally, since most applications expect only a single location for storage, such applications will not generally allow you to SAVE anything to the memory card (i.e., they do not offer the option to choose a storage location). However, some applications (for instance, the Sony Mobile “Camera” application) may actually allow you to do so. Other applications, for example, backup applications such as the Sony Mobile “Memory” application, will by definition be configured to copy content from the Internal Storage to the external SD card.

On the other hand, when it comes to reading from an external SD Card, you will be able to access content (for example, videos, photos and music) on a memory card inserted in this slot without any special consideration since the Android system searches all available memory for content. Therefore, such products may be regarded as supporting a fourth type of memory, called “External Card” or “SD Card”.

4. **SD Card** (known as “/ext_card” from a programmer’s point of view, or by other names in other Android products) is the name for the removable SD memory card in all 2013 Sony Mobile products. As described above, this External Card memory is generally more limited in that any application can read from it, but many applications cannot save to this card. Only a few applications, including backup applications and file manger applications, have the capability to save to this card.

Backing up data to different memory types
Generally, you should not save photos, videos and other personal content solely on the internal memory of a device. If something should happen with the hardware, or if the device is lost or stolen, the data stored on the device’s internal memory is gone forever.

In a device where an SD card reader is the main memory, it is relatively easy to take the card out and copy all content to a PC or Mac, or to an entertainment device with a memory card slot. In a product featuring Internal Storage as the main memory, it is not possible to physically remove the memory. Instead, any critical or high-value content must either be copied to an external SD card by a special backup application, transferred to remote storage over a network (mobile or Wi-Fi), or to a computer via a USB cable.

To facilitate the transfer of data via a cable, the Xperia™ Z Ultra supports the Microsoft standard, Media Transfer Protocol (MTP), which makes it possible to easily transfer content back and forth between your device and a Windows PC. For Apple Mac computers, a special application called Sony Bridge for Mac is available with built-in support for MTP. This application can be downloaded from the Xperia™ Z Ultra Support page.

Note that you do not need to back up or make a copy of applications that you have downloaded from the Google Play™ Store. They can normally be downloaded again after you have set up your Google account to work in a new device (or in a device where the memory has been completely erased).

Note 1:
As noted above, some Android devices, including Sony Mobile devices from 2012 and Sony Ericsson devices from 2011 and earlier, do not use a single “Internal Storage” for both applications (and their data) and user content. Instead, these devices use either an external SD card for user content, or a corresponding area of internal memory to reproduce the functionality of an SD card. In such devices, there is a fixed limit between the application area (“/data”) and the user content area (“/sdcard”), with the result that user content can build up and reach this limit. The consequence of such a limit being reached, for example, for the camera application, would be that no new pictures could be taken even if there was still a considerable amount of free space in the application area (or in the user content area). In such an instance, the download and installation of new applications would also not be possible, even if there was enough free memory in the content area.

Note 2:
Some devices with integrated storage have abandoned the distinction between the application area and the content area when it comes to a Factory Data Reset. As a result, there is no option in such devices to perform a Factory Data Reset and preserve content. In such devices, all content is mandatorily and completely deleted from the device when a reset is performed.

In contrast, Sony Mobile’s memory integration solution makes it possible to preserve user content in this situation. Therefore, when performing a Factory Data Reset, the default action will still be to only remove applications and their data, and an option box must be checked if all content is to be removed as well (as might be desirable when selling the device second-hand, for instance).

Note 3:
For a developer, it is important to note that from a programming point of view the location names used to refer to the different memory areas described in Note 1 are still valid, i.e., the area used for applications ("/data") is still present, as is the area used for content ("/sdcard").

In reality, "sdcard" is a so-called "symbolic link" to "/data/media". However, from inside an Android application, "/sdcard" can still be used. For example, you can use "sdcard/DCIM/100Android" to find all camera images. The continued use of "/sdcard" to access the content area ensures compatibility across different products and Android releases in this regard.

Trademarks and acknowledgements

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Visit *www.sonymobile.com* for more information.

SONY

White paper

June 2013

Xperia™ Z Ultra

C6843

Note: Screen images are simulated.

Purpose of this document

Sony™ product White papers are intended to give an overview of a product and provide details in relevant areas of technology.

Document history

Version		
June 2013	First released version	Version 1

Sony Mobile Developer World

For the latest technical documentation and development tools, go to *www.sonymobile.com/developer.*

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Product overview

Xperia™ Z Ultra – Big screen. Big entertainment.

- 6.44” HD Triluminos™ Display for mobile powered by X-Reality™ for mobile engine
- Ultra slim, waterproof and dust-resistant
- LTE & Qualcomm Snapdragon™ 800 quad-core 2.2 GHz processor
- Multi-task, write and sketch with any pencil
- Full accessory ecosystem for premium entertainment

Ultra large display

Built with the latest Sony BRAVIA technology, the Xperia™ Z Ultra is the first smartphone to incorporate Triluminos™ Display for mobile, for a wider palette of rich natural colours. This breakthrough technology includes X-Reality™* for mobile, Sony’s intelligent display technology which analyses each image to optimise colours, sharpness and contrast for vivid image quality whilst the super resolution feature reproduces lacking pixels for the sharpest videos.

** X-Reality™ for mobile will be available for this device through the forthcoming software upgrade available to download over the air. Sony Mobile will use reasonable endeavours to make this software available to end users in the week commencing September 9th, 2013 or as soon as possible thereafter. Software updates made available at different times depending on operator and country. Please check the version of software on your device as you may already have the latest software, depending on the date of purchase.*

Ultra entertainment

Watch movies, play games, read books and browse the web – with the Xperia™ Z Ultra’s extra-large HD screen. The superb sound quality of Sony’s ClearAudio+ and xLoud™ enhancement offers an exceptional hearing experience.

With the reader app, you can download your favourite e-books and enjoy them on your big screen. Through Sony’s media apps, you can discover the best way to enjoy and share photos, music and videos. And with a combination of Sony’s best technologies, you’ll get seamless access to online and offline content, for easy social sharing and endless discovery.

Ultra business

Besides entertaining, the Xperia™ Z Ultra is an ideal business partner. The super responsive screen comes with handwriting recognition and is compatible with a stylus or even an ordinary pencil. You’ll always be ready to record your best ideas the moment they hit you. And the carbon-copy function allows you to memorise notes and sketches. The design of the Xperia™ Z Ultra paired with the easy-toggle keyboard makes one-handed input easy. And true multi-tasking and small apps mean that you don’t have to lose any valuable time browsing between windows, which helps you improve productivity.

Facts – dimensions, weight, performance and networks

Operating system	Google™ Android™ 4.2 (Jelly Bean)
Processor	1.5 GHz Qualcomm MSM8974 Quad Core
GPU	Adreno 330
Size	179.4x92.2x6.5 mm
Weight	212 grams
Available colours	Black White Purple
SIM card	Micro SIM
Main screen	
Colours	16,777,216 colour TFT
Resolution	1920x1080 pixels
Size (diagonal)	6.44 inches
Scratch-resistant	Shatterproof sheet on scratch-resistant glass
Input mechanisms	
Text input	On-screen QWERTY keyboard
Touch screen	Capacitive
Touch gesture	Yes – multi-touch, up to 10 fingers supported
Memory	
RAM	2 GB
Flash memory	Up to 16 GB*
Expansion slot	microSD™ card, up to 64 GB (SDXC supported)
Camera	
Camera resolution	8 MP
Digital zoom	16x
Video recording	Yes – HD 1080p
Front Camera	Yes – HD 1080p for video chat and 2 MP for camera capture
Sensors	
Accelerometer	Yes
Proximity sensor	Yes
Ambient light sensor**	Yes

Magnetometer	Yes
Gyroscope	Yes
Networks	
C6843	UMTS HSPA+ 850 (Band V), 900 (Band VIII), 1700 (Band IV), 1900 (Band II), 2100 (Band I) MHz GSM GPRS/EDGE 850, 900, 1800, 1900 MHz LTE (Bands I, II, III, IV, V, VII, VIII, XX)
Data transfer speeds	
GSM GPRS	Up to 107 kbps
GSM EDGE	Up to 296 kbps
HSUPA (upload)	Cat 6, up to 5.8 Mbps
HSDPA (download)	Cat 24, up to 42 Mbps
LTE (upload)	Cat 4, up to 50 Mbps
LTE (download)	Cat 4, up to 150 Mbps
Talk time (GSM)	Up to 14 hours**
Standby time (GSM)	Up to 790 hours**
Talk time (UMTS)	Up to 16 hours**
Standby time (UMTS)	Up to 820 hours**
Standby time (LTE)	Up to 660 hours**
Music listening time	Up to 120 hours**
Video playback time	Up to 7.5 hours**
Battery (Embedded)	3050 mAh typical 3000 mAh minimum

** Memory comprises approximately 5 GB of firmware plus 11 GB of "Internal storage" for music, pictures and movies, and downloaded applications and their data. For more details about memory, See "Memory in Android™ devices" on page 15.*

*** Values are according to GSM Association Battery Life Measurement Technique as performed in controlled laboratory conditions. Actual time may vary.*

NOTE: Battery performance may vary depending on network conditions and configurations, and phone usage.

NOTE: All performance metrics are measured under laboratory conditions.

Categorised feature list

Camera
8 megapixel camera
16x digital zoom
Auto focus
Burst mode
HDR for pictures and movies
Face detection
Front-facing camera (2 MP 1080p)
Geotagging
HD video recording (1080p)
Image stabiliser
Object tracking
Picture Effect
Quick Launch
Scene recognition
Self-timer
Send to web
Smile Shutter™
Sony Exmor RS® for mobile
Image sensor
Superior Auto
Sweep Panorama
Touch capture
Touch focus
White balance

Music
3D Surround Sound (VPT)
Album art
Bluetooth® stereo (aptX®, A2DP)
ClearAudio+
Clear Bass
Clear Phase™
Clear stereo
Dynamic normalizer
Music tones (MP3/AAC)
PlayNow™ service*
SensMe™
TrackID™ music recognition*
“WALKMAN” application
xLoud™ Experience

Internet
Bookmarks
Google Chrome™
Google Play™
Google™ search*
Google Voice™ Search*
Google Maps™ for Mobile with Street view and Latitude™*
NeoReader™ barcode scanner*
Pan & zoom

Communication
Call list
Facebook™ application*
Google Talk™ application*
Noise suppression
Polyphonic ringtones
Speakerphone
Twitter™ application*

Messaging
Conversations
Email
Google Mail™*
Handwriting recognition
Instant messaging
Multimedia messaging (MMS)
Predictive text input
Sound recorder
Text messaging (SMS)
Voice input

Design
Auto rotation
Face Unlock
Gesture input
IPX5 and IPX8 (waterproof) & IP5X (Dust-resistant)
On-screen QWERTY keyboard
Pen input with stylus
Sensor-on-lens
STAMINA mode
Screenshot capturing
Throw
Triluminos™ Display for mobile
Touchscreen
X-Reality™ for mobile
Wallpaper

Entertainment

3D games
Media browser
Motion gaming
PlayMemories
Radio (FM radio with RDS)
Reader mode
SensMe™ slideshow
Sony Entertainment Network*
TV launcher
Video streaming
YouTube™*

Organiser

Airplane mode
Alarm clock
Calculator
Calendar
Contacts
Document readers
eCompass™
Notes
Setup guide
Stopwatch
Tasks
Timer

Connectivity

3.5 mm audio jack (CTIA)
ANT+ sport fitness
aGPS*
Bluetooth® 4.0 wireless technology
DLNA Certified®
GLONASS
MHL support
Media Go™
Media Transfer Protocol support
Micro USB support
Native USB tethering
NFC
PC Companion
Screen mirroring
Synchronisation via Exchange ActiveSync®
Synchronisation via Facebook™
Synchronisation via Google™
Synchronisation via SyncML™
USB charging
USB High speed 2.0 support
Xperia Link™
Wi-Fi®
Wi-Fi® Hotspot functionality

** This service is not available in all markets.*

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Bluetooth® wireless technology

Bluetooth® profiles supported	Advanced Audio Distribution Profile v1.2 (A2DP) Audio/Video Remote Control Profile v1.3 Device Identification Profile v1.3 Generic Attribute Profile Client/Server over LE Handsfree Profile v1.6 (Wide band speech) Headset Profile v1.2 Health Device Profile v1.1 Human Interface Device Profile, Host role v1.1 Messaging Access Profile v1.0 Object Push Profile v1.1 Personal Area Networking Profile v1.0 Phonebook Access Profile v1.1 Proximity Monitor Profile over LE v1.0 Serial Port Profile v1.1
Core version and supported core features	Version 4.0
Other supported features	aptX® CD quality audio streaming over Bluetooth®
Connectable devices	Products support at least one of the Bluetooth® profiles above. Bluetooth® 4.0 accessories generally require installation of a supporting application.

More information:

www.sonymobile.com/developer

www.bluetooth.com

Wi-Fi®

Supported standards	IEEE 802.11a/b/g/n/ac and Wi-Fi® Wi-Fi Direct, Wi-Fi Protected Setup
Connectable devices	Wi-Fi® access points Wi-Fi Direct compatible devices
Frequency band	2.4 GHz/5 GHz
Data transfer rate	Up to 325 Mbit/s
Security	Open Authentication Shared Authentication EAP-SIM EAP-AKA EAP-TLS EAP-TTLS/MSCHAPv2 PEAPv0/EAP-MSCHAPv2 PEAPv1/EAP-GTC WPA Personal and WPA2 Personal WPA Enterprise and WPA2 Enterprise
Encryption	WEP 64 bit, WEP 128 bit, TKIP and CCMP (AES)
Power save	WMM-UAPSD
QoS	WMM

DLNA Certified® (Digital Living Network Alliance)

Supported Device Classes	**M-DMS – Mobile Digital Media Server** Media Types: images, music and video Summary: The digital media server exposes the media files in your phone to a Wi-Fi® network. The files can then be accessed from other DLNA Certified® clients. **+PU+** Media Types: image, video and music Summary: Play media in the phone on another device, such as a TV or computer using 2 box push technology. +PU+ is integrated in the Album, Movies and “Walkman” applications. **M-DMP – Mobile Digital Media Player** Media Types: image, video and music Summary: Play content stored on another device, for example, a server or a PC, directly on the phone. **+DN+** Media Types: video and music Summary: Download content stored on another device, for example, a server or a PC, and play the downloaded content directly on the phone.
Supported Bearers	Wi-Fi® Wi-Fi® Direct
DRM Support	The DLNA Certified® implementation does not support DRM-protected content. DTCP-IP is supported for Japanese product.

Messaging

MMS (Multimedia Messaging Service)

According to OMA Multimedia Messaging Service v1.0 + SMIL

Email

Bearer type (IP)	GPRS, EGPRS, UMTS
Character sets	BIG5 Traditional Chinese GB18030 ISO-2022-JP Japanese ISO-8859-1 ISO-8859-2 Eastern Europe ISO-8859-5 Cyrillic ISO-8859-7 Greek ISO-8859-9 Turkish ISO 8859-11 KOI8-R Cyrillic Shift_JIS Japanese US-ASCII UTF-16 UTF-8 Windows® 874 Windows® 1251 Cyrillic Windows® 1252 Windows® 1254 Turkish Windows® 1258 Vietnamese
Protocols	POP3 and IMAP4
Push email	Microsoft® Exchange ActiveSync® (EAS)
Secure email	SSL/TLS, both port methods (POPS/IMAPS) and STARTTLS
HTML mail	Yes (read only)

More information:

www.sonymobile.com/developer

www.openmobilealliance.org

Positioning – location based services

Supported standards:

- OMA Secure User Plane Location (SUPL) v1.0 & v2.0
- 3GPP™ Control Plane location (incl. Emergency location)
- Qualcomm® GPSOneXtra™

Supported satellite systems:

- GPS
- GLONASS

NOTE*:* GPS and GLONASS are used together to calculate the position. Positioning is more robust and accurate in most conditions if both systems are active. The benefits of using GLONASS are automatically available for all applications using the Satellite Positioning API (referred to "GPS Provider" in Android terminology).

Provisioning (OMA CP)

OMA CP version 1.1

Multimedia (audio, image and video)

Audio Playback	**Decoder format**	**Supported in file format**
	MP3	MP3 (.mp3)
	AAC (AAC-LC, AAC+, eAAC+)	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a), ADTS (.aac)
	AMR-NB, AMR-WB	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4a), AMR (.amr, .awb)
	MIDI	SMF (.mid), XMF (.xmf), Mobile XMF (.mxmf), OTA (.ota), RTTTL (.rtttl), RTX (.rtx), iMelody (imy)
	PCM	WAV (.wav)
	OTA	OTA (.ota)
	Vorbis	OGG (.ogg)
	FLAC	FLAC (.flac)
Audio Recording	**Encoder format**	**Supported in file format**
	AMR (AMR-NB, AMR-WB)	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a), AMR (.amr)
	AAC	3GPP (.3gp, 3gpp), MP4 (.mp4, .m4a)
Image Playback	**Decoder format**	**Supported in file format**
	Windows bitmap	BMP (.bmp)
	GIF	GIF (.gif)
	JPEG	JPEG (.jpg, .jpeg)
	PNG	PNG (.png)
	Wireless Bitmap	WBMP (.wbmp)
	WebP	WebP (.webp)
Image Capture	**Encoder format**	**Supported in file format**
	JPEG	JPEG (.jpg)

Video Playback	Decoder format	Supported in file format
	MPEG-4	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv), AVI (.avi), Xvid (.xvid)
	MPEG-2 (only for Japanese market)	MPEG2-TS (.ts)
	H.264	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv), MPEG2-TS (.ts)

Synchronisation (OMA DS, EAS, Google Sync™)

OMA Data Synchronisation protocol versions 1.1.2 and 1.2

OMA Data Formats: vCard 2.1, vCalendar 1.0

Microsoft® Exchange ActiveSync® protocol version 2.5

Microsoft® Exchange ActiveSync® protocol version 12

Microsoft® Exchange ActiveSync® protocol version 12.1

Microsoft® Exchange ActiveSync® protocol version 14

Microsoft® Exchange ActiveSync® protocol version 14.1

Google Sync™

Related information:

www.sonymobile.com/developer

Web browser

Google Chrome™ for Android™ is pre-installed.*

Related information:

https://play.google.com/store/apps/details?id=com.android.chrome

* Google *Chrome™ is not available for all markets.*

Memory in Android™ devices

To use Android devices efficiently, users should be aware of the different types of device memory. This knowledge is important in order to understand, for example, where music, photos and videos are saved; how many apps can be downloaded from Google Play™; and how photos can be copied to a PC.

The below information is also of interest to developers who want to optimise their programs to make the best possible use of the resources in the device.

Generally, all Android devices share the same basic memory setup. What differs is how much memory is available to you via the different types of memory, and whether your device uses an external SD card or an internal memory chip. Any information specific to the particular device model described in this White Paper is noted as such.

Types of memory

The types of memory described and numbered below are consistent with the terminology used in Sony mobile device menus and in other content relating to 2013 Xperia™ devices:

1. **Dynamic Memory** (also known as RAM) is used by applications that run when the device is turned on. The amount of Dynamic Memory influences how many applications and operating system services can run at the same time. The Android operating system automatically closes applications and services that are not being used.

   However, such automatic functionality has limits. For example, if a lower amount of free RAM is available to applications after a new release of the operating system (due to increased capabilities in the system), device speed will eventually be impacted. This is the main reason that a device cannot be indefinitely upgraded to newer releases of Android™.

   If you experience problems with RAM, for example, if the device runs slower than usual or if the Home application restarts frequently when you leave an application, you should minimise the use of apps that run all the time. Such apps could include, for example, applications that frequently download social networking service updates. You could also consider using a static wallpaper instead of a live wallpaper.

   To see which apps and services are currently active, go to **Settings > Applications > Running Services**. You should have at least 50 MB, and ideally 100 MB or more, of free RAM to avoid slowdowns and application restarts.

   You should also be aware that if you update the device to a later Android release, the load on the built-in Dynamic Memory will increase due to the addition of more features, as mentioned above. As a result, the device may run slower after an update.

   The Xperia™ Z Ultra has about 2 GB of RAM available to the Android OS and applications, of which about 200 MB is already used out of the box.

2. **System Memory** (also known as “System partition” or “/system”) is used for the Android OS and for most applications that are pre-loaded from the factory. This type of memory is normally locked, and can only be changed through a firmware upgrade. There is usually some free space available in this section of memory. However, since it is locked, you cannot save apps, photos or any other content to this memory. System Memory is reserved for future firmware upgrades, which almost always need more memory than the original firmware. You cannot see or influence the use of this memory.

3. **Internal Storage** is memory used as” working” memory. It can be compared to the C: drive on a PC or to the startup disk on a Mac.

This type of memory is used to store all application downloaded from the Google Play™ Store (and other sources) as well as their settings and data (such as emails, messages and calendar events, for example). All applications have an allocated area which no other applications can access and where the application data can be stored.

Some game applications also store content such as game music and game level information outside their own designated area. In most cases, an application can choose to save its data in a location of its own choosing (outside the protected application settings area). Generally, such content is not deleted when an application is uninstalled; it must be removed manually by connecting the device to a computer with a USB cable, or by using a file manager application.

Internal Storage is also used for all user content added, for example, as a result of the user taking photos with the camera, downloading media files, and performing file transfers. Typical user content includes:

- photos
- movies
- music
- downloaded documents (as email attachments, for example)

Internal Storage will tend to fill up as a result of normal usage. Examples of such usage are the saving of data by applications; the downloading and installation of new applications; the downloading of free or paid content; and the shooting of pictures and movies. Therefore, the larger this memory is from the start, the more applications you can download and use, and the more pictures and movies you can shoot.

If the Internal Storage starts to get full, the device slows down, and in some cases it might no longer be possible to install more apps. You should always ensure that you have at least 100 MB of free Internal Storage. If not, you should consider removing some apps that you seldom use, or move content that you do not frequently access to safe storage.

You can see approximately how much Internal Storage is free in **Settings** > **Storage** >**Internal Storage**. You can also view more detail about how much memory is used by applications in **Settings** > **Applications** > **Manage Applications**. In the Xperia™ Z Ultra, about 11 GB of Internal Storage is available out of the box.

Please note that in Sony Mobile 2013 products, “Internal Storage” is now the combination of what was previously known as “Device Memory” or “Phone Memory” (for applications and their data – also previously known as “/data”) and “Internal Storage” (for user’s content – also previously known as “/sdcard”). The reason for this change is to make the use of available memory more flexible, and also to enable the optional encryption of user’s content.

Memory card slot

In some products you may find both a large internal memory and a memory card reader slot. However, on the current Android platform, the card reader slot does not work in the same manner in a device with a large internal memory as it does in a device with ONLY a memory card slot.

Generally, since most applications expect only a single location for storage, such applications will not generally allow you to SAVE anything to the memory card (i.e., they do not offer the option to choose a storage location). However, some applications (for instance, the Sony Mobile “Camera” application) may actually allow you to do so. Other applications, for example, backup applications such as the Sony Mobile “Memory” application, will by definition be configured to copy content from the Internal Storage to the external SD card.

On the other hand, when it comes to reading from an external SD Card, you will be able to access content (for example, videos, photos and music) on a memory card inserted in this slot without any special consideration since the Android system searches all available memory for content. Therefore, such products may be regarded as supporting a fourth type of memory, called “External Card” or “SD Card”.

4. **SD Card** (known as “/ext_card” from a programmer’s point of view, or by other names in other Android products) is the name for the removable SD memory card in all 2013 Sony Mobile products. As described above, this External Card memory is generally more limited in that any application can read from it, but many applications cannot save to this card. Only a few applications, including backup applications and file manger applications, have the capability to save to this card.

Backing up data to different memory types
Generally, you should not save photos, videos and other personal content solely on the internal memory of a device. If something should happen with the hardware, or if the device is lost or stolen, the data stored on the device’s internal memory is gone forever.

In a device where an SD card reader is the main memory, it is relatively easy to take the card out and copy all content to a PC or Mac, or to an entertainment device with a memory card slot. In a product featuring Internal Storage as the main memory, it is not possible to physically remove the memory. Instead, any critical or high-value content must either be copied to an external SD card by a special backup application, transferred to remote storage over a network (mobile or Wi-Fi), or to a computer via a USB cable.

To facilitate the transfer of data via a cable, the Xperia™ Z Ultra supports the Microsoft standard, Media Transfer Protocol (MTP), which makes it possible to easily transfer content back and forth between your device and a Windows PC. For Apple Mac computers, a special application called Sony Bridge for Mac is available with built-in support for MTP. This application can be downloaded from the Xperia™ Z Ultra Support page.

Note that you do not need to back up or make a copy of applications that you have downloaded from the Google Play™ Store. They can normally be downloaded again after you have set up your Google account to work in a new device (or in a device where the memory has been completely erased).

Note 1:
As noted above, some Android devices, including Sony Mobile devices from 2012 and Sony Ericsson devices from 2011 and earlier, do not use a single “Internal Storage” for both applications (and their data) and user content. Instead, these devices use either an external SD card for user content, or a corresponding area of internal memory to reproduce the functionality of an SD card. In such devices, there is a fixed limit between the application area (“/data”) and the user content area (“/sdcard”), with the result that user content can build up and reach this limit. The consequence of such a limit being reached, for example, for the camera application, would be that no new pictures could be taken even if there was still a considerable amount of free space in the application area (or in the user content area). In such an instance, the download and installation of new applications would also not be possible, even if there was enough free memory in the content area.

Note 2:
Some devices with integrated storage have abandoned the distinction between the application area and the content area when it comes to a Factory Data Reset. As a result, there is no option in such devices to perform a Factory Data Reset and preserve content. In such devices, all content is mandatorily and completely deleted from the device when a reset is performed.

In contrast, Sony Mobile’s memory integration solution makes it possible to preserve user content in this situation. Therefore, when performing a Factory Data Reset, the default action will still be to only remove applications and their data, and an option box must be checked if all content is to be removed as well (as might be desirable when selling the device second-hand, for instance).

Note 3:
For a developer, it is important to note that from a programming point of view the location names used to refer to the different memory areas described in Note 1 are still valid, i.e., the area used for applications ("/data") is still present, as is the area used for content ("/sdcard").

In reality, "sdcard" is a so-called "symbolic link" to "/data/media". However, from inside an Android application, "/sdcard" can still be used. For example, you can use "sdcard/DCIM/100Android" to find all camera images. The continued use of "/sdcard" to access the content area ensures compatibility across different products and Android releases in this regard.

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